The Chemical Age

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Three Presidential Addresses

THE presidential addresses by Sir Edward Thorpe as President of the British Association, by Sir William Pope as President of the Society of Chemical Industry, and by Dr. M. O. Forster as President of the Chemistry Section of the B.A. constitute together a notable indication of the internal mind and point of view of modern chemistry. Much of the addresses was occupied with the history of recent achievements, with comparisons of the state of chemical knowledge at particular periods. At Montreal something had to be said about the mere business of chemical organisation. In Dr. Forster's address there is much highly technical matter of primary interest to the academic mind. All these matters are of the internal order; the progress and the problems of chemistry as they appeal particularly to the chemist. The addresses, however, have all a larger external aspect, which deals with chemistry in its attitude to the needs and life of the world, and it is some of these we select briefly for mention.

Sir Edward Thorpe's address closes with a protest against the degradation of chemistry to the uses of war. Chemical warfare is to him abhorrent, as indeed it must be to all civilised persons. If it were possible to get all scientists to agree that their work should never be utilised for the destruction of mankind, but only and always for human service, it would be a splendid vow. But it would mean the cancellation or the reversal of much that is now accepted without question. Nearly every recognised instrument of war would be impossible but for the services of the scientist. Battleship, submarine, aircraft, explosives, gunnery, transport, and all the rest depend on the constant support and application of science, which is thus turned without protest to purposes the very opposite of those contemplated by Sir Edward Thorpe. It is not, therefore, a question whether science, chemical or any other, shall be degraded to the service of war; it is so degraded now by every nation. The question whether poison gas should be used becomes, therefore, a mere detail in a much broader issue. Some may think it a little worse, some a little better, than other forms of warfare, but so long as we accept war as a fact, the question in what particular way we dispatch the enemy is a mere refinement. Everyone, of course, will sympathise with Sir Edward Thorpe's humane feeling on this subject, but the reference is clearly to Sir William Pope's recent article in THE CHEMICAL AGE, and we fear that his point of view is still far from being understood.

The common note in Sir William Pope's and Dr. Forster's addresses is the return to nature as the source of energy and raw materials. Here we seem to be on the eve of a new epoch. Already the prophets see the last ton of coal and the last gallon of oil won from the earth, and future supplies coming from the vegetation which performs more chemical miracles than any laboratory Here the chemist comes very near to the problem, fundamental to all others, that of life, and it may well be that the next great advance may come from the study of the living organism. And there is a passage in Dr. Forster's address which recalls the kind of social or religious problems which Darwin, Tyndall, Huxley and others, consciously or unconsciously, set going. He insists on the inherence in nature of the egoist impulse, which sustains individual life, and pleads not for its eradication, but for its subjection to altruistic ends. "Nature ignored or misunderstood is the enemy of man; nature studied and controlled is his friend." Something very like this, allowing for the change in terms, may be found in Pauline theology or philosophy; and it is to the credit of the addresses of this year that already they have set people thinking in terms higher and larger than those concerned in any material or industrial applications of science.

Overproduction in the Oil Industry

DURING the past six months conditions in the oil industry have been decidedly mercurial, and although the cost of all forms of oil has shown a steady decline the shares of the leading undertakings have come through a depressing period with a far greater show of stability than might have been expected. The actual position in the industry is still more or less nebulous; but, if one takes America as the barometer, there would appear to be little doubt that a situation has arisen—in spite of predictions that over-production was a very remote possibility—where supply has temporarily exceeded demand. The remarkable cut which has been made in wholesale prices in America is illustrated by the fact that Pennsylvanian crude has fallen from 30s. to 11s. per barrel; and, while the retail purchaser has not yet reaped the full benefit of the fall, the tendency is shown by the recent reduction of 6d. per gallon in petrol and the drop of about 17 per cent. in the value of fuel oil.

As another example of the situation so far as the heavier fractions are concerned may be quoted gas oil, which, during one period of the war, reached the unprecedented level of 18d. per gallon to large consumers. Within recent weeks this grade has been down to something under 6d. per gallon, although it has still a good deal of leeway to make up before it returns to its 1914 price. Recognised oil authorities have only recently remarked that the industry in the United States is to-day in a state of complete chaos, and we are told that the three main factors which have contributed to this condition of affairs are (*a*) stagnation of trade, (*b*) tightness of money, and (*c*) the unending struggle for supremacy between the refiners and the producers. In plain language, there can be little question that America has passed through a period of trade depression far exceeding in severity that which has been experienced in this country. This depression has temporarily lowered the demand for fuel and lubricating oils, and as the banks are not in an accommodating frame of mind it has not been possible to hold the oil in storage until the horizon clears. It has had, therefore, to be foisted upon a reluctant market.

In some quarters there is an impression that as trade revives and the demand for oil increases the world will be confronted with an oil shortage which will be followed by enormously enhanced prices. Such a situation would, no doubt, suit the books of the oil-producing concerns; but while with present available sources it can scarcely be expected that a state of overproduction can last indefinitely, it would seem very improbable that the situation will ever be so favourable to the producer as to permit of the substantial increase in price which is conjectured.

Treatment of Chemical Burns

ACCIDENTS, the majority of which are fortunately slight, so frequently happen when caustic substances are being handled both on the works and in the laboratory, and so much depends upon the first aid treatment applied, that in all instances where there is a possibility of mishaps of the kind occurring some recognised method of dealing with them should be instituted. The treatment must naturally vary in accordance with the degree of the injury. That is to say, a comparatively slight burn would not be dealt with in the same way as would a serious injury, much depending upon whether the damage has extended beyond the epidermis. The golden rule to observe is that first aid, if it is to be of any real value, must be immediate aid. Particular attention has been given to the matter in America, where great faith is placed in the shower bath, which must, of course, be used before any attempt is made to remove clothing, efforts being confined to getting a large volume of water between the caustic soaked clothing and the skin. After thorough soaking has been effected a saturated solution of sodium bicarbonate should be applied to the affected area in the case of acid burns, and a 2 per cent. solution of acetic acid used in the case of alkali burns. Dr. A. K. Smith has said that in simple first-degree burns mopping the burned area with dry gauze and the application of a clean ointment, such as boric acid or oxide of zinc ointment, may be made by spreading a liberal layer on gauze and holding it in place with a gauze bandage. Such treatment relieves the pain and is sufficient with renewal of dressing occasionally. In more serious burns the wound should be cleansed of all loose rolled up epidermis, mopped with a mild antiseptic, such as boric acid solution, and an ointment applied on gauze, held in place by a rather loose bandage.

It is injuries to the eyes which, perhaps, give rise to the greatest anxiety, and in such cases burns by caustic substances are best dealt with at once by douching the eye with a solution of bicarbonate of soda in the case of acid burns and a 1 per cent. or 2 per cent. solution of acetic acid in alkali burns, after which a piece of boric acid ointment about the size of a pea is put under the eyelid and carefully worked into all corners by gentle manipulation on the outside of the eyelid. After that the patient should be left to the care of a qualified doctor. There are, of course, many other methods of treatment commonly employed with success, but those outlined above are considered to give the quickest relief from pain while ensuring a rapid recovery.

The Foster Alcohol Process

IT would appear that in such remote localities as the Sandwich Isles the motor alcohol problem has been carried to a successful conclusion without very much news of what is being done reaching the outside world. Some time ago the Foster process was adopted in Hawaii, and the product obtained has answered its purpose so satisfactorily that further plant is to be erected. One large agricultural undertaking has, in fact, decided to substitute alcohol entirely for the petrol it now uses in its fleet of tractors and lorries. Districts of the kind, of course, are particularly fortunately placed, for sugar production is the main industry, consequently large quantities of molasses are available. It is estimated that the Hawaiian Islands alone have a potential production of nearly eight million gallons of 95 per cent. alcohol. The most satisfactory method of production seems to be

that introduced by Mr. J. P. Foster, whose process consists in adding to each 100 gallons of ethyl alcohol, five gallons of ether, two gallons of kerosene, and one gallon of pyridine. After the alcohol is denatured as above 40 gallons of ether are added to each 60 gallons of alcohol and the mixture is ready for use. It is of interest to note that the ether used in the denaturing process is distilled off from the ethyl alcohol itself as a secondary process in the operation of the Foster plant, the alcohol being treated with sulphuric acid and then re-distilled, 1¼ gallons of the former being required to produce one gallon of ether. The final spirit has the following composition:—Alcohol 55·5 per cent., ether 42·8 per cent., kerosene 1·1 per cent., and pyridine 0·6 per cent. The waste molasses resulting from the manufacture of every ton of sugar should, it is claimed, yield 15 gallons of de-natured alcohol, and the object of adding de-naturing ether to the extent called for in the Foster process is to enable the fuel to be utilised with the carburettors already installed. Pyridine is employed to neutralise the products of combustion of the ether and alcohol, for being a strong alkaline base, it also produces ammonia on explosion, thus having the desired effect. Apparently, the usual difficulties with starting up were experienced with alcohol alone, but the admixture of more volatile products, *e.g.*, ether, gives the required relief from such trouble as well as very greatly increased flexibility of operation.

The Montreal Meetings

THE British delegates to the Montreal meeting of the Society of Chemical Industry speak in very warm terms of the welcome extended to them by their Canadian hosts, and the atmosphere is of a particularly friendly kind. No detailed reports are yet to hand, but there is every prospect of profitable discussions, and the opportunities for visiting Canadian chemical works will be particularly appreciated. On the other hand, Canadian chemists and engineers will welcome the chance of discussion and exchange of views with their British friends.

The new president, Dr. R. F. Ruttan, has created a very favourable impression on those who are making his acquaintance for the first time, and there is hardly need to repeat what we have said already that he will have during his term of office the loyal and active support of all parties. His greatest public work, in the opinion of Canadians, has been accomplished through his connexion with the Dominion Government in matters relating to industrial research. First as head of the Committee on Chemistry and later as Chairman of the Advisory Committee for Scientific and Industrial Research, he has devoted much time and effort to securing a Research Institute for Canada. This work, originating during the war, has brought him in touch with Canadian industries and the men engaged in them, and this connexion must be of great value to him as head of the Society. Dr. Ruttan has the reputation for good fellowship which comes naturally to a man with athletic outdoor tastes. No longer quite equal to long-distance running or test-match cricket, he finds consolation and refreshment in golf, and is said to play a very fair game. He has joined enthusiastically in the Canadian welcome to British guests, and when he visits this country, sometime during his term of office, he may count on an equally cordial reception here.

Ash Removal from Coal

THE production of a coal of low ash content for use in specific processes and the recovery of combustibles from "fines" of high ash content, are questions of economic importance, and the efforts made at Skinningrove by the application of the froth flotation process will be remembered. Experiments upon a different line—the Trent process—are described by Perrott and Kinney, Associate Physical chemist and Assistant Metallurgical chemist respectively, of the U.S. Bureau of Mines. The process consists in vigorously agitating finely powdered coal with oil and water, but differs from the froth flotation method in that 30 per cent. of oil is used (calculated upon the weight of coal). An "amalgam" of coal and oil results, which contains about 7-12 per cent. of water, which, however, can be pressed out by mechanical working in a manner similar to the working of butter, so that 5 per cent. water is left. The "amalgam" is a plastic fuel, capable of being stored under water, and can be fed on to a furnace by shovelling or forced through pipes by pressure. The ash originally present in the fuel is practically entirely removed with the water, after the formation of the "amalgam." Oil losses by emulsification with the water drawn off, or by retention in the ash, are negligible.

The Calendar

Sept. 7–14	British Association for the Advancement of Science: 89th Meeting.	Edinburgh.
7–28	Shipping, Engineering & Machinery Exhibition.	Olympia, London.
12–17	Seventh National Exposition of Chemical Industries.	8th Coast Artillery Armoury, New York.
19 to Oct. 29	Royal Photographic Society of Great Britain: 66th Annual Exhibition.	35, Russell Square, W.C. 1.
Sept. 21–23	Institute of Metals: Annual Meeting	Birmingham.
28	Faraday Society: "Catalysis with Special Reference to Newer Theories of Chemical Action." General discussion.	——
Oct. 5	Chemical Industry Club: Address by Sir William J. Pope, K.B.E., on his impressions of his tour in Canada.	2, Whitehall Court, London.
7	Society of Chemical Industry: Manchester Section: Chairman's address, "The Disposal of Waste Liquors." 7 p.m.	Textile Institute, St. Mary's Parsonage, Manchester.
8	Mining Institute of Scotland: General Meeting.	Edinburgh.

Book Received

CHEMICAL DISINFECTION AND STERILIZATION. By Samuel Rideal and Eric K. Rideal. London: Edward Arnold & Co., pp. 313. 21s.

TEXTILE BLEACHING. By Alec B. Steven. London: Sir Isaac Pitman & Sons, Ltd. Pp. 134. 3s. net.

The Hydrogenation of Naphthalene—(II.)

Applications of "Tetralin"

In the first portion of his article, which appeared last week, the writer discussed the various developments in the catalytic hydrogenation of naphthalene. Below he enumerates the commercial applications of "Tetralin," and shows that it is capable of being manufactured at a price which would render its use profitable in many industries.

ONE of the most important applications of "Tetralin" is as a turpentine substitute. Immense interest and controversy has been aroused, particularly in Germany, in this matter. A general survey only can be given here, but it is significant to note that in 1920 almost a score of papers appeared upon this matter in the "Farben Zeitung."

If both turpentine and tetralin are available, what are the objections to the use of the latter, when in the matter of cost it has a material advantage? It has been urged that the varnish films produced on drying were not nearly so perfect as when turpentine was used in the varnish. The slowness of drying is also stated to be an objection.

On the other hand, it is repeatedly urged that tetralin is not responsible for the faults observed when a paint is found to apply badly. Imperfections in the film may be due to the other constituents of the paint, or varnish, and it cannot be denied that a large number of successful formulæ have been developed. If desired, mixtures of other solvents may be made with tetralin, and empirical "mixes" discovered. The high flash point, whilst necessarily associated with slow "drying," is an obvious advantage from the point of view of safe working.

But perhaps one of the chief objections urged against the use of tetralin was the rose or yellow colour which certain white painted objects developed when tetralin had been used in the preparation of the paint or enamel. The question as to whether or no the tetralin is responsible cannot be said to have been definitely settled, claim and counter-claim following one another in quick succession. The suggestion has been made that a rigorous control of raw materials—synthetic resins, manganese "driers," &c., may be mentioned in passing as alleged causes of the development of the rose tint—would enable entirely successful paints to be made with the help of tetralin. Moreover, it has been shown that some of the constituents of certain woods—for instance, furfurol—will react with sesame oil to give a rose colour.

The observation that a strip of wood, painted and remaining white six months, developed a rose tint when exposed to the vapours of tetralin, will require explanation, however.

From the above short account, it will be seen that expression of definite opinions either for or against tetralin as a turpentine substitute, cannot be made with justification. There is no doubt that thorough investigation of the problem will be forthcoming, for many successful results have been obtained during the war, and since, and the lower cost of tetralin is a great inducement to substitution.

Tetralin as a Solvent

The application of tetralin as a solvent for substances other than resins is claimed in the German Patent No. 320,807 (Tetralin G.m.b.H.). It is stated that fats of all kinds, ethereal oils, rubber, dyes, solid and liquid hydrocarbons, &c., can be dissolved by means of tetralin, and subsequently recovered from solution by crystallisation or evaporation of the solvent under reduced pressure.

The extensive use of the new solvent cannot be expected in the near future in these respects. Controversy has been rife in the matter of the use of tetralin in the rubber industry, and its application as a solvent for the extraction of oils and fats from seeds and kernels cannot be looked for, in view of its high end-boiling point—well over 200°C. The same applies to the extraction of ethereal oils, and although isolated instances may be found where tetralin will be useful, no large scale use can be foretold.

Lubricating Oils from Tetralin

Viscous lubricating oils may be manufactured by the condensation of an alkyl or acid chloride with tetra-hydro naphthalene (German Patent No. 319,799). Still better, however, is the product from the reaction between the chlor derivative of tetra-hydro naphthalene with the hydrogenated naphthalene itself.

Tetralin is easily converted into a chlor derivative—the chlorine substituting in the aromatic ring, of course—by passing a current of dry chlorine into the hydrocarbon in the presence of penta chloride of phosphorus. Equal parts of the chlor derivative and the untreated hydro naphthalene are mixed and heated slowly to 180°C. in the presence of phosphorus pentoxide. The product is then distilled under a pressure of 15 mm., and the fraction boiling between 240°C. and 243°C. is a viscous oil. The fluorescent oil possesses a specific gravity of 1·104 at 15°C., and has a viscosity (Engler) of 35·5 degrees at 50°C. On sulphonation it will yield a good "soluble" oil.

Derivatives of Tetralin

The aromatic nucleus existing in tetralin is reactive in the same way as that of benzene, and hence many derivatives can be produced. Relatively few have as yet been manufactured, but some of the more important and technically applicable compounds will be indicated.

Sulphonation.—Tetra-hydro naphthalene β sulphonic acid is easily obtained by adding tetralin to a slight excess of 100 per cent. sulphuric acid. The temperature rises to 80°, and the sulphonation is completed by heating on the water bath. The sulphonic acid can be recovered by pressing free from sulphuric acid, or, better, by converting to an alkali salt and recovering in the usual manner.

Naturally, the corresponding tetra-hydro naphthol can be produced by fusion of the sulphonic acid with caustic soda or potash, lime being added if desired. The tetra-hydro β naphthol is soluble in alkalis, in the alkaline salts of fatty acids or in sulphonated fatty acids. It is useful as a disinfectant (German Patent No. 299,603, Schroeter and Schrauth).

When treated with chlor sulphonic acid, tetralin gives the sulpho chloride which itself can be reduced by means of zinc and hydrochloric acid to form the tetra-hydro thio naphthol. The latter combines with chlor acetic acid to yield tetra-hydro naphthol thio acetic acid. The latter compound forms the starting point for the production of tetra-hydro thio naphthyl indigo.

This example is only given as illustrative of the many possible transformations into which tetralin can be brought by reason of the reactivity of the "benzene" part of the molecule. Remembering the chemistry and applications of benzene derivatives, it is unnecessary to elaborate in anticipation of the application of tetralin in similar directions.

Nitration.—Mono, di, tri and poly nitro derivatives of tetra-hydro naphthalene can be prepared by ordinary methods of nitration, and from the nitro bodies, well-known treatment will lead to the amino derivatives, nitro-amino, "benzidene," &c., hydrazo, azoxy, and azo compounds, and so on. The infinite potentialities of the new hydrocarbon in the fields of dye and medicinal chemistry are apparent, and if tetralin can be produced as cheaply as benzene, naphthalene—one of the waste products of coal distillation to-day—will rise to economic importance.

The results of Rowe (J.S.C.I., 1920, 14, 241T) are significant in this connexion. Many aryl derivatives of tetra-hydro naphthylamine have been examined, and found suitable for application in the dye industry, provided supplies were cheap and plentiful enough. (In this work, the hydrogenation of naphthalene was not accomplished by catalytic methods, but by the Bamberger-Kitchelt method—the reduction of naphthalene in amyl alcoholic solution with sodium.)

Other Uses of Tetralin

Tetralin and decalon have been suggested, and to some extent used, during times of economic stress, as fuel for internal combustion engines and as burning oils.

Although the calorific value of the latter hydrocarbon is 10,800, as compared with that of benzene 10,000, there is the serious objection of very high flash point, and difficulties must be anticipated in other directions. As a motor fuel, the hydro naphthalenes can have little future, even when competing at equal or lower prices with petrol, alcohol, benzene.

Wimmer has shown in German Patent 302,408 that tetralin can be burnt in an ordinary paraffin lamp, with a highly

luminous flame and with no burner troubles. Other burning oils may be mixed with the naphthalene derivative. Here, again, it is unlikely that the hydrogenated naphthalene can compete in normal times with such burning oils as kerosene, which should always be capable of production at a lower figure than that at which tetralin can be made.

Tetralin, mixed with amyl alcohol and other solvents, will dissolve linoxyn and paint films (German Patent No. 320,152).

It has also been suggested as an insecticide.

The Cost of Tetralin

There are several of the suggested applications of tetralin which deserve close attention. Foremost, perhaps, are the uses as turpentine substitute, and as the corner stone upon which to build a synthetic organic products industry, dyes, fine chemicals, medicinals, &c.

But these applications only become possible if tetralin can be produced at a cost approximately equal to that of benzene, and less than that of turpentine.

The price of the raw material for tetralin manufacture—namely, naphthalene—is to-day £9 to £13 per ton. This may be an altogether fictitious price if naphthalene were required in large quantity. Purification charges should entail no serious loss of naphthalene, and should cost not more than £2 per ton, if Fuller's earth and finely divided nickel are used in the method, as described above. This charge includes the cost of recovery and preparation of the finely divided nickel.

The actual hydrogenation, again, is not a costly operation when pure naphthalene is treated. The cost of the 5 or 10 per cent. of supported nickel catalyst, especially as it can be utilised a number of times before recovery of the nickel becomes necessary, will not be more than the same amount, £2 per ton of naphthalene treated.

The hydrogen required for the production of a ton of tetra-hydro naphthalene amounts to about 13,000 cubic ft. at ordinary temperature. To this figure must be added at least 2,000 cubic ft. to cover hydrogen used in the reduction of the nickel catalyst and mechanical losses, which are never inconsiderable when hydrogen is circulated under high pressure. This is particularly the case when stirring mechanism has to be fitted into the autoclave, as in this case.

We may, therefore, assume the consumption of 15,000 cubic ft. of hydrogen per ton of tetralin produced.

At a cost of 5s. per 1,000 cubic ft.—a figure covering production charges by the newest methods, interest and depreciation—the hydrogen required in the production of 1 ton of tetralin would cost nearly £4.

Interest and depreciation and general charges cannot be definitely assessed in the case of the hydrogenation and purifying operations, but a high estimate may reckon these as £7, so that the over-all operating costs amount to £15 per ton tetralin.

Thus, according to the price at which a good commercial naphthalene can be purchased, the cost of tetralin may vary between £25 and £35 per ton, the cheapest grades of naphthalene costing around £10 per ton, and the "refined" around £20 per ton. That is, tetralin can be produced at from 2s. 2d. to 3s. per gallon, at which price it could be profitably employed in many industries. Benzol cannot be obtained at much less, and derivatives of tetra-hydro naphthalene should, therefore, be able to compete with benzene derivatives in the matter of cost. Turpentine prices have varied so much in the near past that a comparative figure cannot be given, but there is no question whatever that the price has been well in advance of the above estimated cost of tetralin.

Stainless Iron

ONE of the most recent discoveries of the steel works chemist, states the *Manchester Guardian Commercial*, is stainless iron, a product which combines some of the properties of stainless steel, while at the same time it is more easily manipulated, and can thus be adapted to numerous uses to which the toughness of stainless steel is unsuited. The discovery of stainless iron arose from a desire to make stainless steel more amenable to manipulation by the craftsman in cutlery and toolmaking, and the new product is really a quality of stainless steel in which there is only about a third of the carbon content used in the making of stainless steel.

New Income Tax Provisions

To the Editor of THE CHEMICAL AGE

SIR.—The Finance Act, 1921, just passed into law, contains a number of important Income Tax provisions affecting the tax-paying public, the principal of which are the following:—

1. The much-discussed Section 43 of 1918 Act (allowing current year to be brought into average) and Section 44 (allowing actual year as basis if total income thereof is under 90 per cent. of assessed amount) are declared repealed as from 1920-21, and made retro-active therefrom.

2. The well-known Rule 3 (granting relief in respect of "specific cause" in certain circumstances by way, usually of reduction to the actual profits) is also declared not to apply for 1920-21 and after, when the taxpayer has continued through out the year to carry on the trade, &c.

3. By Section 27, the holders of Government Securities, the interest on which is not now taxed at source, may require income tax to be deducted before payment instead of accounting later for it.

4. Charities may now claim (subject to certain conditions) exemption from Schedule "A" Tax in respect of lands, &c., both occupied and owned, from Schedule "B" Tax as occupier of lands, and from Schedule "D" Tax, if the work connected with the trade is mainly carried on by beneficiaries and profits belong to the Charity.

5. The restriction to two-thirds of the rent or annual value allowance in respect of business premises used partly for residence is, by Section 31, removed, and the Commissioners are empowered to grant a greater amount of allowance if they think fit.

6. The arrangements relative to Superannuation Funds from the basis of legislation under Section 32, whereby such Funds are exempted (subject to certain conditions) from tax on investments or deposits, whilst contributions of employers and employees are to be allowed as expenses.

Certain other Sections are contained in the Act, but they are not of general importance or interest.—Yours, etc.,

W. R. FAIRBROTHER.

67/68, Cheapside, E.C.2.

Iron and Steel Institute

Annual Meeting in Paris

MORE than 200 members were present at the meeting in Paris on Monday of the Iron & Steel Institute. Dr. J. E. Stead, the president, was prevented through illness from attending, and the chair was taken by Sir Hugh Bell. The members were welcomed by Monsieur de Wendel, president of the Comité des Forges de France, who, in the course of his address, recalled the fact that the Institute had not met in Paris since the exhibition year of 1900. However cordial relations between the French and British members of the Institute were twenty years ago, he said, they were now on a different footing after the brotherhood of arms against a common enemy. He invited his British colleagues about to visit Lorraine to endeavour to appreciate French mentality as regards Germany, and to study the situation, not only from the economic, but from the higher political standpoint, especially in view of the possibility of a German menace in the future.

An interesting paper on the "Iron Ore Deposits of Eastern and Western France" was read by M. Nicou. Professor H. Louis disagreed with the author's statement on Great Britain's dependence on foreign ore. He said there were 3,400,000,000 tons of ore available in Great Britain, and much of it was not utilised because foreign ore was cheaper.

Lord Leverhulme and Lewis

DISTRIBUTING prizes last week at Stornoway, Lord Leverhulme intimated that all his development works in Lewis are to be suspended until the return of normal conditions. The proposed extension of Stornoway Harbour and the construction of new roads on the island could not proceed till normal costs were restored. He was returning to London, but would be kept in close touch with conditions in Lewis, and he hoped for that full and complete recovery in the present world-wide conditions of trade that would enable development work to be resumed. How soon or how long it would be no one could say.

Some Aspects of Post-War Science, Pure and Applied

By Sir Edward Thorpe, C.B., F.R.S.

The annual meeting of the British Association opened in Edinburgh on Wednesday, and will continue until September 14. We reproduce below the substance of the Presidential Address on "Some Aspects of Post-War Science, Pure and Applied," which was delivered on Wednesday evening by Sir Alfred Ewing in the unavoidable absence through indisposition of Sir Edward Thorpe. The meetings are being held in the old and new University Buildings and in the Usher Hall.

THE British Association for the Advancement of Science owes its origin, and, in great measure, its specific aims and functions, to the public spirit and zeal for the interests of science to Scotsmen. Its virtual founder was Sir David Brewster. Although it was decided that its first meeting of September 27, 1831, should be held at York, and its second and third meetings at the ancient Universities of Oxford and Cambridge respectively, it was inevitable that the Association should seize the earliest opportunity to visit the Metropolis of Scotland where, as an historical fact, it may be said to have had its origin, and the meeting in this city of September 8, 1834, was noteworthy for many reasons.

Sixteen years later, Edinburgh again extended her hospitality to the British Association, which then honoured itself by electing the learned Principal of the United Colleges of St. Salvator and St. Leonard, St. Andrews, to the presidential chair—at once a tribute to Sir David Brewster's eminence as a natural philosopher and a grateful recognition of his services to this body.

I am naturally led to connect the meeting of 1850 with a still more memorable gathering of this Association in this city. In August, 1871—just over half a century ago—the British Association again assembled in Edinburgh under the presidency of Lord Kelvin—then Sir William Thomson. Lord Kelvin, with characteristic force and insistence, still further elaborated the theme which had been so signal a feature of Sir David Brewster's address twenty years previously: "Whether we look to the honour of England," he said, "as a nation which ought always to be the foremost in promoting physical science, or to those vast economical advantages which must accrue from such establishments, we cannot but feel that experimental research ought to be made with us an object of national concern, and not left, as hitherto, exclusively to the private enterprise of self-sacrificing amateurs, and the necessarily inconsecutive action of our present Governmental Departments and of casual committees."

Lord Kelvin, as might have been anticipated, pleaded more especially for the institution of physical observatories and laboratories for experimental research, to be conducted by qualified persons, whose duties should be not teaching, but experimenting. Such institutions as then existed, he pointed out, only afforded a very partial and inadequate solution of a national need. They were, for the most part, "absolutely destitute of means, material, or *personnel* for advancing science, except at the expense of volunteers, or of securing that volunteers should be found to continue such little work as could then be carried on."

There were, however, even then, signs that the bread cast upon the waters was slowly returning after many days. The establishment of the Cavendish Laboratory at Cambridge, by the munificence of its then Chancellor, was a notable achievement. Whilst in its constitution as part of a university discipline it did not wholly realise the ideal of the two Presidents, under its successive directors, Professor Clerk-Maxwell, the late Lord Rayleigh, and Sir J. J. Thomson, it has exerted a profound influence upon the development of experimental physics, and has inspired the foundation of many similar educational institutions in this country.

National Physical Laboratory

In the establishment of the National Physical Laboratory we have an approach to the ideal which my predecessors had so earnestly advocated. That the National Physical Laboratory has, under the ability, organising power and business capacity of its first director, Sir Richard Glazebrook, abundantly justified its creation is recognised on all hands. Its services during the four years of war alone are sufficient proof of its value.

It was at the Edinburgh meeting, under Lord Kelvin's presidency, fifty years ago, that I first became a member of this Association, and had the honour of serving it as one of the secretaries of its chemical section. Fifty years is a considerable span in the life of an individual, but it is a relatively short period in the history of science. Nevertheless, those fifty years are richer in scientific achievement and in the importance and magnitude of the utilitarian applications of practically every branch of science than any preceding similar interval. The most cursory comparison of the state of science, as revealed in his comprehensive address, with the present condition of those departments on which he chiefly dwelt, will show that the development has been such that even Lord Kelvin's penetrative genius could hardly have anticipated. No previous half-century in the history of science has witnessed such momentous and far-reaching achievements. In pure chemistry it has seen the discovery of argon by Rayleigh, of radium by Madame Curie, of helium as a terrestrial element by Ramsay, of neon, xenon, and krypton by Ramsay and Travers, the production of helium from radium by Ramsay and Soddy, and the isolation of fluorine by Moissan. These are undoubtedly great discoveries, but their value is enormously enhanced by the theoretical and practical consequences which flow from them.

In applied chemistry it has witnessed the general application of the Gilchrist-Thomas process of iron-purification, the production of calcium cyanamide by the process of Frank and Caro, Sabatier's process of hydrogenation, a widespread application of liquefied gases, and Haber's work on ammonia synthesis—all manufacturing processes which have practically revolutionised the industries with which they are concerned.

In pure physics it has seen the rise of the electron theory, by Lorentz; Hertz's discovery of electro-magnetic waves; the investigation of cathode rays by Lenard, and the elucidation of crystal structure by Bragg.

In physical chemistry it has witnessed the creation of stereo-chemistry by Van t'Hoff and Le Bel, Gibbs' work on the phase rule, Van t'Hoff's theory of solutions, Arrhenius's theory of ionic dissociation and Nernst's theory of the galvanic cell.

All thinking men are agreed that science is at the basis of national progress. Science can only develop by research. Research is the mother of discovery, and discovery of invention. The industrial position of a nation, its manufactures and commerce, and ultimately its wealth, depend upon invention. Its welfare and stability largely rest upon the equitable distribution of its wealth. All this seems so obvious, and has been so frequently and so convincingly stated, that it is superfluous to dwell upon it in a scientific gathering to-day. A late distinguished admiral, you may remember, insisted on the value of reiteration. On this particular question it was never more needed than now.

The Value of Research

It is, unfortunately, only too true that the industrial world has in the past underrated the value of research. One indication that the nation is at length aroused to its importance is to be seen in the establishment of the Department of Scientific and Industrial Research, with its many subordinate associations. Research has now become a national and State-aided object. For the first time in our history its pursuit with us has been organised by Government action.

The molecular theory of matter—a theory which in its crudest form has descended to us from the earliest times and which has been elaborated by various speculative thinkers through the intervening ages—hardly rested upon an experimental basis until within the memory of men still living. When Lord Kelvin spoke in 1871, the best-established development of the molecular hypothesis was exhibited in the kinetic theory of gases as worked out by Joule, Clausius and Clerk-Maxwell. As he then said, no such comprehensive molecular

theory had ever been even imagined before the nineteenth century. But he clearly perceived that, definite and complete in its area as it was, it was but a well-drawn part of a great chart, in which all physical science will be represented with every property of matter shown in dynamical relation to the whole. The prospect we now have of an early completion of this chart is based on the assumption of atoms.

In spite of the fact that the atomic theory, as formulated by Dalton, has been generally accepted for nearly a century, it is only within the last few years that physicists have arrived at a conception of the structure of the atom sufficiently precise to be of service to chemists in connection with the relation between the properties of elements of different kinds, and in throwing light on the mechanism of chemical combination.

Sir J. J. Thomson was the first to afford direct evidence that the atoms of an element, if not exactly of the same mass, were at least approximately so, by his method of analysis of positive rays. By an extension of this method, Mr. F. W. Aston has succeeded in showing that a number of elements are in reality mixtures of isotopes.

Determination of Constants

The term "atomic weight" has acquired for the chemist an altogether new and much wider significance. It has long been recognised that it has a far deeper import than as a constant useful in chemical arithmetic. For the ordinary purposes of quantitative analysis, of technology and of trade, these constants may be said to be now known with sufficient accuracy. Their determination and study must now be approached from entirely new standpoints and by the conjoint action of chemists and physicists. The existence of isotopes has enormously widened the horizon. At first sight it would appear that we should require to know as many atomic weights as there are isotopes, and the chemist may well be appalled at such a prospect. All sorts of difficulties start up to affright him, such as the present impossibility of isolating isotopes in a state of individuality, their possible instability, and the inability of his quantitative methods to establish accurately the relatively small differences to be anticipated. All this would seem to make for complexity. On the other hand, it may eventually tend towards simplification. If, with the aid of the physicist, we can unravel the nature and configuration of the atom of any particular element, determine the number and relative arrangement of the constituent protons and electrons, it may be possible to arrive at the atomic weight by simple calculation, on the assumption that the integer rule is mathematically valid.

The crisis through which we have recently passed has had a profound effect upon the world. The spectacle of the most cultured and most highly-developed peoples on this earth, armed with every offensive appliance which science and the inventive skill and ingenuity of men could suggest, in the throes of a death struggle, must have made the angels weep. That dreadful harvest of death is past, but the aftermath remains. The Great War differed from all previous internecine struggles in the extent to which organised science was invoked and systematically applied in its prosecution. In its later phases, indeed, success became largely a question as to which of the great contending parties could most rapidly and most effectively bring its resources to their aid. The chief protagonists had been in the forefront of scientific progress for centuries, and had an accumulated experience of the manifold applications of science in practically every department of human activity that could have any possible relation to the conduct of war. April 25, 1915, which saw the clouds of the asphyxiating chlorine slowly wafted from the German trenches towards the lines of the Allies, witnessed one of the most bestial episodes in the history of the Great War.

It is notorious that the great chemical manufacturing establishments of Germany had been for years previously sedulously linked up in the service of the war which Germany was deliberately planning—probably, in the first instance, mainly for the supply of munitions and medicaments. We may suppose that it was the tenacity of our troops, and the failure of repeated attempts to dislodge them by direct attack, that led to the employment of such foul methods. Be this as it may, these methods became part of the settled practice of our enemies, and during the three succeeding years—that is, from April, 1915, to September, 1918—no fewer than eighteen different forms of poison (gases, liquids and solids) were employed by the Germans. On the principle of Vespasian's law, reprisals became inevitable, and for the greater part of three years we had the sorry spectacle of the leading nations of the world flinging the most deadly products at one another that chemical knowledge could suggest and technical skill contrive. Warfare, it would seem, has now definitely entered upon a new phase. The horrors which the Hague Convention saw were imminent, and from which they strove to protect humanity, are now, apparently, by the example and initiative of Germany, to become part of the established procedure of war. Civilisation protests against a step so retrograde. Surely comity among nations should be adequate to arrest it.

Chemical Warfare

The case for what is called chemical warfare has not wanted for advocates. It is argued that poison gas is far less fatal and far less cruel than any other instrument of war. It has been stated that "amongst the 'mustard gas' casualties the deaths were less than 2 per cent., and when death did not ensue complete recovery generally ultimately resulted . . . . Other materials of chemical warfare in use at the Armistice do not kill at all; they produce casualties which, after six weeks in hospital, are discharged practically without permanent hurt." It has been argued that, as a method of conducting war, poison-gas is more humane than preventive medicine. Preventive medicine has increased the unit dimension of an army, free from epidemic and communicable disease, from 100,000 men to a million. "Preventive medicine has made it possible to maintain 20,000,000 men under arms and abnormally free from disease, and so provided greater scope for the killing activities of the other military weapons. . . . Whilst the surprise effects of chemical warfare aroused anger as being contrary to military tradition, they were minute compared with those of preventive medicine. The former slew its thousands, whilst the latter slew its millions, and is still reaping the harvest." This argument carries no conviction. Poison gas is repugnant to the right feeling of civilised humanity. It in no wise displaces or supplants existing instruments of war, but creates a new kind of weapon, of limitless power and deadliness. "Mustard gas" may be a comparatively innocuous product as lethal substances go. It certainly was not intended to be such by our enemies. Nor, presumably, were the Allies any more considerate when they retaliated with it. Its effects, indeed, were sufficiently terrible to destroy the German *moral*. The knowledge that the Allies were preparing to employ it to an almost boundless extent was one of the factors that determined our enemies to sue for the Armistice. But if poisonous chemicals are henceforth to be regarded as a regular means of offence in warfare, is it at all likely that their use will be confined to "mustard gas," or, indeed, to any other of the various substances which were employed up to the date of the Armistice? To one who, after the peace, inquired in Germany concerning the German methods of making "mustard gas," the reply was: "Why are you worrying about this when you know perfectly well that this is not the gas we shall use in the next war?"

Preventive Medicine

I hold no brief for preventive medicine, which is well able to fight its own case. I would only say that it is the legitimate business of preventive medicine to preserve by all known means the health of any body of men, however large or small, committed to its care. It is not to its discredit if, by knowledge and skill, the numbers so maintained run into millions instead of being limited to thousands. On the other hand, "an educated public opinion" will refuse to give credit to any body of scientific men who employ their talents in devising means to develop and perpetuate a mode of warfare which is abhorrent to the higher instincts of humanity.

This Association, I trust, will set its face against the continued degradation of science in thus augmenting the horrors of war. It could have no loftier task than to use its great influence in arresting a course which is the very negation of civilisation.

Starting in 1911 with an output of 90 tons, the CHEMICAL PULP INDUSTRY in British Columbia has increased year by year until in 1920 the output reached 108,670 tons. The value of pulp and paper production in 1920 in British Columbia was $21,500,000, making it one of the most important industries in the province.

Society of Chemical Industry

Notes on the Fortieth Annual Meeting at Montreal

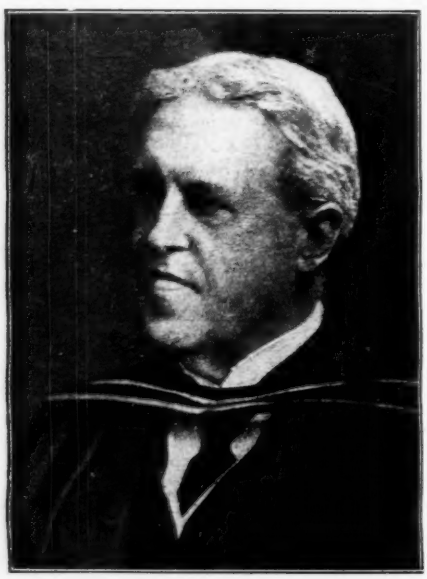
We give below a short biographical account of Dr. R. F. Ruttan, the new President of the Society, together with the first of a series of impressions of the visit and some notes on the meetings and exhibitions visited in Canada and the United States.

The New President

His Distinguished Record in Scientific Work

DR. ROBERT FULFORD RUTTAN, M.A., M.D., D.Sc., F.R.S.C., the newly elected President of the Society of Chemical Industry, was born at Newburgh, Ontario, in 1856. He graduated from Toronto University in 1881, and obtained the gold medal for chemistry at the McGill University in 1883, studying later for two years in Germany. In 1887 he entered the McGill University as lecturer. In 1912 he was made Director of Chemistry for the University, holding the double title of Macdonald Professor of Chemistry and Professor of Organic and Biological Chemistry.

He has re-organised and consolidated the teaching of chemistry in the University which has generously supplied



DR. R. F. RUTTAN.

him with a large and efficient staff, and has taken special interest in developing post-graduate work and chemical research. He has represented the Faculty of Medicine on the corporation of the University since 1891 and is a member of several of the important standing committees of McGill.

In 1895 he was elected a Fellow of the Royal Society of Canada. He has been twice president of the section composed of mathematicians, chemists and physicists, and in 1917 was elected president of the Royal Society. He was elected president of the Alumni Association of the McGill Medical Faculty in 1908 and has always been greatly interested in promoting closer relations between the graduates and the University. In 1914 the degree of D.Sc. was conferred upon him by the University of Toronto.

Dr. Ruttan's activities in the field of chemistry have been varied and extensive. He was one of the original members of the Canadian Branch of the Society of Chemical Industry and was elected chairman in 1913.

He was elected as one of the members of the Honorary Advisory Council for Scientific and Industrial Research in 1916 and is chairman of two of its most important committees, namely, the Committee on Assisted Researches and the Associate Committee on Chemistry. He has displayed much energy in connexion with the developments of the utilisation of fish waste in Canada; in the modification of the patent law giving the members of the scientific staff of the Government the right to patent their inventions and discoveries; the introduction of duty free alcohol in Canada for industrial purposes; and the publication of a census of the chemical industries of Canada by the Government. He acted as chairman of each of the special committees dealing with these questions. This year he was elected administrative chairman of the council. He represented Canada at the International Research Council, in 1919, and was one of the founders of the International Union of Chemistry at Brussels in 1919. He has taken an active part in bringing about the establishment of the National Research Institute for Canada.

Research Work

Dr. Ruttan's research work has been almost entirely confined to organic and biological chemistry. He has at various times investigated industrial and other general chemical problems. Some years ago he made a very complete study of the waters of the Ottawa and St. Lawrence rivers. also of the waters of several mineral springs. He was for many years consulting chemist to the Federal Department of Railways and Canals. He has also been called upon on several occasions to act as assessor to Canadian judges in cases involving chemical problems. He was largely instrumental in obtaining legislation abolishing the use of poisonous phosphorus in the manufacture of matches in Canada.

Dr. Ruttan is a member of a large number of chemical societies, including the American Association of Biological Chemists and is a member of several social clubs, including the Chemists' Club, New York, the Rideau Club, Ottawa, the Mount Royal Club and the University Club, Montreal. In 1917 he was elected president of the University Club, of which he was an original member.

Dr. Ruttan has always taken a considerable interest in athletic sports. As a student he was a successful long-distance runner and played in many important cricket matches in Ontario. He was a volunteer of the University Company of the Queen's Own Rifles, Toronto, a splendid shot, and winner of several regimental and company cups. He was the first president of the McGill Cricket Club, which he established in 1883 and was a member of the Canadian Olympic Committee in 1908.

He is a very keen golfer and has done much to develop the game in Canada. From 1903 to 1907 he was president and captain of the Royal Montreal Golf Club and was elected president of the Royal Canadian Golf Association in 1907. At the Canadian Seniors' Golf Association tournament held at the Royal Montreal Golf Club, in 1918, he won the cup for the best net score, presented by F. A. Rolph, the president. He is an enthusiastic traveller and has made a number of trips, covering most of the countries of Europe. He has visited Lower and Upper Egypt and spent a winter in Mexico and the West Indies.

The Extended Programme

Visits to Montreal Industries

The full itinerary for the week prior to the meeting allowed for golf, motor trips and other social engagements on Aug. 23, while on August 24, 25 and 26 visits were arranged to selections from the following industrial plants: Borden Farm Products (milk pasteurisation); St. Lawrence Sugar Refinery; Frontenac Breweries; Gillette Safety Razor Co.; Dominion Engineering Works (manufacturers of paper machines and turbines); Canada Cement Co. (plant closed at present); Imperial Oil Co.; Ogilvie Flour Mills; C.P.R. Angus Shops; American Locomotive Works; National Electric Products Co. (manufacturers of electrolytic oxygen); and the Canada Car & Foundry Co.

On the afternoon of August 24 members again took part in golf and motor trips, and the following afternoon was spent in a visit to and afternoon tea at the University of Montreal.

The morning of August 26 was devoted to a boat trip round the harbour and luncheon was partaken on board. On the afternoon of the following day members witnessed the regatta of the G.T.R. Boating Club.

Golf and motor trips on Sunday, August 28, completed the pre-meeting engagements.

Although several more members may arrive later, the full United Kingdom company up to the beginning of the meeting comprised: Sir William Pope; Mr. R. H. Clayton; Dr. J. P. Longstaff; Dr. F. W. Atack; Dr. L. A. Jordan; Mr. E. A. Alliott; Mr. C. S. Garland and Mrs. Garland; Capt. C. J. Goodwin; Mr. P. Kerr; Mr. J. Heap; Mr. Le Good; Mr. F. W. Gamble and Mrs. Gamble; Mr. Lawrence and Mrs. Lawrence; Mr. Maschwitz and Mr. J. MacWilliam.

In addition to his Presidential Address, the text of which appeared in THE CHEMICAL AGE last week, Sir William Pope gave an illustrated lecture on "Cambridge University and Town." The papers read at the meeting included the following: "The Need for Reform in the Education of Chemists," by Professor Lash Miller; "The High Speed Paper Machine at the Laurentide Company's Plant," by George D. Kilbury; "The Action of Thiocyanates on Cellulose," by R. H. Clayton and H. E. Williams (read by Mr. Clayton, Manchester); "Moving Pictures of Paper Manufacture at Price Brothers' Plant at Kenogani," by Mr. Dawe; "The Properties of Pure Hydrogen Peroxide," by O. Maass; "The Relative Density of Alkali Amalgam and Mercury," by J. R. Withrow; "Observations on the Chemistry of Rubber," by G. S. Whitby; "The Manufactured Properties and Employment of Heat Intercepting Glass," by G. Allerman; "The Preparation of Synthetic Chemically Pure Organic Chemicals," by G. E. K. Mees; "The Briquetting of Lignite," by L. Thomas; "Peat and its Preparation for the Market," by E. V. Moore; "The Theoretical Considerations in the Hargreaves' Process," by Professor K. W. Bain; and "The Activity of Carbon," by Professor E. G. R. Ardagh.

Notes on Arrival in Canada

QUEBEC, *August 22.*

"AS the sun rose on the 18th August, 1921, the New World lay in reality before them" and the second phase of the "great adventure" is now beginning. The good ship *Melita* has, with splendid good taste, made a record passage, not only for herself, but for the ships of her class.

We have all seen icebergs, porpoises and other weird denizens of the deep; some have seen other things, too, and, no doubt, these will provide good stories on our return.

Some 18 members of the party, headed by Sir William J. Pope, K.B.E., the retiring President of the Society, embarked at Liverpool on August 12. A few more are to come on later, and several have arrived on this side already.

Our Canadian hosts have already extended the original programme almost beyond recognition, and in consequence of the changes we disembarked at Quebec. There we were met by Dr. Ruttan, F.R.S.C., the President-Elect of the Society, and Director of the Chemical Department of McGill University; Sir George Garneau, K.C.M.G., who is prominently identified with the civic life of Quebec and the Laval University. He is a member of the Research Council and Chairman of the Battlefields Preservation Commission, and was formerly a member of the Legislative Assembly; Mr. Wandleworth, Vice-President of the National Drug & Chemical Co., Montreal; Mr. M. L. Davies, Vice-President and General Manager of the Standard Chemical Co., Toronto; Dr. Milton Hersey, President of the Milton Hersey Co., consulting engineers and chemists, and a director of the C.P. Railway; and Dr. MacLean, Vice-President of J. T. Donald & Co., analytical and consulting chemists, and an Assistant Professor of Chemistry at McGill University.

On the St. Lawrence

Friday, August 19, was favoured with gorgeous weather and, after leaving Sir George Garneau and Mr. Gamble at the Golf Club (Mr. Gamble being the official golfer to the party), an excursion was made by automobile to the Montmorency Falls and the beautiful neighbourhood of Ste. Anne de Beaupré, some 20 miles from Quebec along the banks of the St. Lawrence.

In the evening Sir George Garneau entertained the company to dinner at the Garrison Club, with the exception of Sir William Pope and Dr. Jordan, who were invited to stay at Government House, Spencer Wood, as the guests of the Lieut.-Governor of the Province of Quebec, Sir Charles Fitzpatrick, K.C.M.G. On the day following the party were received by Sir Charles and were subsequently entertained at luncheon.

Visiting Mr. Taft

Everyone greatly enjoyed the beauty of the grounds of Spencer Wood, which are steeped in the history of the Franco-British struggle in Canada. Near by is the National Battlefields Park, where one appreciates at once how the history of the country has been preserved, and not a little of our pleasure was derived from the vivid descriptions of the battles supplied by Sir George Garneau. After listening to him no one could fail to visualise Wolfe's thin red line, 4,000 men in all, who in 10 minutes' clash of arms settled the fate of our empire. Monuments have been erected on the historic sites, and the inscriptions upon them are indicative of the spirit of mutual respect which animates the French-Canadian and the British sections of the community. What could be better than the "Monument aux Braves" without distinction of race? It is not many years since British troops officiated at the ceremony which commemorated the French victory at the second battle of the Plains, the last battle fought in Canada.

Later the same evening the party reached the Manoir Richelieu, Pointe-à-Pic, Murray Bay, a delightful pleasure resort 90 miles down the river from Quebec. An enjoyable and comparatively (but only comparatively) quiet week-end was spent there. Mr. Taft, ex-President and now Chief Justice of U.S.A., has a summer residence near by and he kindly invited the party to visit him.

The Voyage

Some mention should be made of our experiences aboard the boat. There were few casualties, but the eclipse of one small voice must be recorded, which for lengthy periods was heard only in the outer darkness. It is only fair to say, however, that after a day or two on land his powers are fully restored.

At a concert on board the vessel, Sir William Pope presided; he directed the proceedings with such care and told one or two good stories with such telling effect that quite a large sum of money was raised for seamen's charities.

Individuals embarked on the vessel, but left it as but *units* of a whole. The President has but to command and we obey; in fact, the sense of discipline is so great that it leads to distressing consequences at times.

It has been pointed out that this arises invariably through lack of discipline in early youth. By saying that the party is now a party it is not suggested that all individual characteristics have been submerged. Careful search will still reveal traces of the old Adam.

First there is the "Very Earnest Person" with whom it is *de rigueur* to be seen only with unpleasantly titled volumes. Then we have the "Ordinarily Earnest" rank who steal furtively about with note-books, polishing up the "pearls of wisdom" to be retailed in Montreal or New York, and the person who started earnestly enough but who has frankly given it up. Finally, there is the out-and-out scoffer who will probably "get there" in the end.

This is an experience for all of us, one that is going to lead to a far different, broader and finer conception of things Canadian than we ever had before.

Impressions of Vastness

The first impression to be forced upon one is that of vastness. On the map Canada compares very well with the North Atlantic in point of size. On the boat we were able to enjoy for a long period the panorama of sea and sky, with never a living thing in sight save our own selves; we know also that the ship made a steady 18 knots hour by hour and day by day, and for every mile of sea we covered there is a mile of Canada and more. The significance of this comparison is instinctively realised.

Yes, Canada must be a big place!!

The general feeling is that we are in for a great time, and that those who have not come are going to miss something. One cannot leave this matter without mentioning again the

lavish hospitality which we are receiving. Dr. Ruttan and his comrades are sparing no pains to entertain us royally. There is a long programme in front of us, and every day brings but a keener realisation of our indebtedness.

We already feel that we must prepare for the return match without delay. L. A. J.

Canadian National Exhibition

Chemical Exhibits at Toronto

During their stay in Toronto members of the Society of Chemical Industry visited the Canadian National Exhibition, a yearly event which attracts on an average no less than 1,000,000 visitors. Until last year there was no chemical section. This year the companies have taken space in the Chemical and Metallurgical Section.

Brunner Mond & Co. (Canada), Ltd., whose plant is at Amherstburg, Ont., were showing soda ash and various grades of caustic soda, &c., while the Canadian Industrial Alcohol Co., Ltd., displayed industrial alcohol of all grades. The various uses of alcohol and the products which require it in the manufacture were illustrated. The chemical side of the salt industry is demonstrated by the Canadian Salt Co., Ltd., and the Canadian Hanson & Van Winkle Co., Ltd., had a good show of electroplating equipment.

In addition to a display of heavy chemicals, the Nichols Chemical Co., Ltd., were showing a magnesium zinc, fluosilicate, and a cement hardener. Watson, Jack & Co., Ltd., were exhibiting chemicals for use in dyestuffs manufacture and specimens of dyed fabrics from Canadian mills. Some English-made dyes and dyehouse machinery were also shown.

Dyes and coloured fabrics were seen at the stand of the National Aniline & Chemical Co., while an unique display of natural magnesium sulphate from British Columbia formed the contribution of the Ontario Oil & Turpentine Co., Ltd. The International Nickel Co., Ltd., had an attractive stand on which were shown nickel products, alloys and machinery parts made with nickel alloys, and T. E. O'Reilly, Ltd., showed a variety of chemicals of Canadian, British and American manufacture.

National Chemical Exposition

The Provisional Programme

According to the provisional programme the following papers will be read during the National Exposition of Chemical Industries which is being held in New York between September 12 and 17 :—

September 13. CRUSHING, GRINDING AND PULVERISING.—"Ball and Pebble Milling for Pulverising and Mixing," by H. F. Kleinfeldt.; "Grinding and Pulverising with Air Separation," by S. B. Kanowitz; "Crushing and Grinding Phosphate Rock," by L. H. Sturtevant; "Dust Collection as Applied to Grinding and Pulverising Problems," by M. I. Dorfan; "The Development of Compound Grinding Mills," by H. Schifflin. INDUSTRIAL PROBLEMS.—"Solvent Extraction of Edible Fats and Oils," by H. Austin; and "Material Handling in Industrial Plants," by R. H. McLain.

September 14. EVAPORATING AND DRYING.—"The Relation of Atmospheric Conditions to Chemical Processes," by A. E. Stacy, Jr.; "Drying and Drying Problems," by H. S. Landell; "Special Problems for Enamelled Evaporators," by Max Donauer; "Drying with Moist Air," by A. B. Stonex; "Drying as an Air-Conditioning Problem," by A. W. Lissauer; "Atmospheric Drying by Means of Compartment, Tunnel and Continuous Belt Conveyor Driers, with Some Practical Applications," by J. D. Stein; "Spray Drying," by W. H. Dickerson; and "Evaporation," by H. Austin.

September 15. PAINTS AND VARNISHES.—"Reflection Factors on Industrial Paints," by H. A. Gardner; "Laboratory Control," by L. P. Nemzek; "Paint and Varnish Waste Control," by R. S. Perry; "Rust: Its Cause and Prevention," by Maximillian Toch; and "Physical Testing of Paints and Paint Materials," by Frank G. Breyer; "The Ideal Paint and Varnish Specification," by F. P. Ingalls; "Save the Surface and You Save All With Paint and Varnish," by Ernest T. Trigg, and "What is Paint?" by G. B. Heckel.

September 16. POWER PLANT IN CHEMICAL INDUSTRIES.—"Modern Boiler House Arrangement and Equipment," by R. M. Gordon; "Suggestions for Reducing Heat Losses in Chemical Plants," by John Primrose; "Boiler Feed Water Treatment and Treatment Control," by E. G. Bashore; "Compressed Air Installation in Industrial Plants," by A. R. Stevenson, Jr.; "The Application of Electric Power in the Chemical Industry," by D. B. Rushmore, J. A. Seede and E. Pragst; "A New Method for Coking Coal as Required for Industrial Fuel," by D. D. Chamberlin; and "The Limitations of Silent Chain Drive," by F. G. Anderson.

A number of cinematograph films will be shown, among them being "The Story of Sulphur," "Making Soap," "Manufacture of Portland Cement," "Usual and Unusual Uses for Abrasives in Some Fifty Industries," "The Making of Oleomargarine," and "The Manufacture of Du Pont Dyes."

American Chemical Society

Papers Read at General Meeting

Among the special features of the general meeting of the American Chemical Society which opened on Wednesday, at Columbia University, were symposiums on filtration and on gas chemistry under the auspices of the Division of Industrial and Engineering Chemistry; a symposium on vitamines by the Division of Biological Chemistry; the Cellulose Section's symposium on cellulose esters, and the symposium of the Petroleum Section on the emulsification problems which confront that industry. Speeches were made by Sir William Pope and by Mr. H. C. Hoover, Secretary of the United States Department of Commerce. The subjects discussed and the speakers were as follows :—

"Science and Civilisation; the Role of Chemistry," by Professor Charles Baskerville, professor of Chemistry at the College of the City of New York, who has conducted extensive researches in anæsthesia and occupational diseases; "Energy: Its Sources and Future Possibilities," by Dr. Arthur D. Little, of Boston, Mass., past president of the American Chemical Society; "The Engineer; Human and Superior Direction of Power," by Dr. Leo H. Baekeland, honorary professor of Chemical Engineering, Columbia University; "Chemistry and Life," by Sir William J. Pope; "Theories and Their Development," by Dr. Willis R. Whitney, head of Research Department, General Electric Co.; "Research Applied to the World's Work," by Dr. C. E. K. Mees, Head of Research Department, Eastman-Kodak Co.; "Problem of Diffusion and Its Bearing on Civilisation," by Professor Ernst Cohen, professor of Chemistry, University of Utrecht; and "Catalysis; The New Economic Factor," by Professor Wilder D. Bancroft, professor of Physical Chemistry, Cornell University.

Leather Trades' Chemists

Extreme Importance of Research

THE conference of the Society of Leather Trades' Chemists, which is to last for three days, opened on Wednesday with a reception at the Leathersellers' Hall, St. Helen's Place.

Mr. H. Compton, Master of the Leathersellers' Company, welcomed the delegates, among whom were French, Belgian, Italian, Spanish, Swiss, and Swedish representatives. Speeches of welcome were also delivered by Dr. J. Gordon Parker, President of the Society of Leather Trades' Chemists, who was in the chair, Mr. W. L. Ingle, President of the United Tanners' Federation, Mr. T. O. Hart, President of the Federation of Curriers, Light Leather Tanners, and Dressers, Dr. R. H. Pickard, representing the Chemical Society, Mr. F. H. Carr (Institute of Chemistry), Mr. W. F. Reid (Society of Chemical Industry), Professor J. Eyre (Royal Microscopical Society), and Mr. L. Archbutt (Society of Public Analysts).

Dr. Parker, in his presidential address, mentioned that bitterness still existed among chemists in Germany at the action of the Society in excluding from their proceedings this country's late enemies. But, he said, the time must come when the two nations would once more work more or less in harmony. Science recognised no nationality. Referring to the problems of their trade, he declared their knowledge was still extremely vague. As chemists they did not really know what hide was. Germany realised the value of research, and the leather trade in that country were devoting the whole of the profits made by the leather companies during the war, amounting to five million marks, to the foundation of a research station for the industry.

Dr. Pickard emphasised the extreme importance of research in the fundamentals of the leather trade, and Professor Eyre stated that the Royal Microscopical Society had recently instituted a leather section, with a view to assisting research.

The Laboratory of the Living Organism

By M. O. Forster, D.Sc., F.R.S.

On Thursday morning Dr. M. O. Forster, President of the Chemistry Section of the British Association for the Advancement of Science, delivered his Address, the substance of which is reproduced below. In following the customary practice of surveying matters of interest which have arisen from recent studies Dr. Forster emphasises those aesthetic aspects of chemistry which offer ample justification for the labour which its pursuit involves.

MANY and various are the reasons which have been urged, at different periods of its history, for stimulating the study of chemistry. In recent years these have been either defensive or frankly utilitarian, in the latter feature recalling the less philosophic aspects of alchemy; moreover, it is to be feared that a substantial proportion of those who have lately hastened to prepare themselves for a chemical career have been actuated by this inducement. It is the duty, therefore, of those who speak with any degree of experience to declare that the only motive for pursuing chemistry which promises anything but profound disappointment is an affection for the subject sufficiently absorbing to displace the attraction of other pursuits. Even to the young chemist who embarks under this inspiration the prospect of success as recognised by the world is indeed slender, but, as his knowledge grows and the consequent appreciation of our ignorance widens, enthusiasm for the beauty and mystery of surrounding nature go far in compensating for the disadvantages of his position. On the other hand, he who has been beguiled into embracing chemistry on the sole ground of believing it to be a "good thing" will either desert it expeditiously or almost surely starve and shower purple curses upon his advisers.

Not only do chemical principles underlie the operations of every industry, but every human being—indeed, every living plant and animal—is, during each moment of healthy life, a practical organic and physical chemist, conducting analytical and synthetical processes of the most complex order with imperturbable serenity. No other branch of knowledge can appeal for attention on comparable grounds; and without suggesting that we should all, individually, acquire sufficient chemical understanding fully to apprehend the changes which our bodies effect so punctually and so precisely—for this remains beyond the power of trained chemists—it may be claimed that an acquaintance with the general outlines of chemistry would add to the mental equipment of our people a source of abundant intellectual pleasure which is now unfairly denied them.

We have to recognise that the minute cells of which our bodies are co-ordinated assemblages, possess and exercise a power of synthetic achievement contrasted with which the classical syntheses, occasionally enticing the modern organic chemist to outbursts of pride, are little more than hesitating preliminaries. Such products of the laboratory, elegant as they appear to us, represent only the fringe of this vast and absorbing subject. Carbohydrates, alkaloids, glucosides and purines, complex as they seem when viewed from the plane of their constituent elements, are but the molecular debris strewing the path of enzyme action and photochemical synthesis, whilst the enzymes produced in the cells, and applied by them in their ceaseless metamorphoses, are so far from having been synthesised by the chemist as to have not even yet been isolated in purified form, although their specific actions may be studied in the tissue-extracts containing them.

Reflect for a moment on the specific actions. The starch in our toast and porridge, the fat in our butter, the proteins in our bacon, all insoluble in water, by transformations otherwise unattainable in the laboratory are smoothly and rapidly rendered transmissible to the blood, which accepts the products of their disintegration with military precision. Even more amazing are the consequences. Remarkable as the foregoing analyses must appear, we can dimly follow their progress by comparison with those more violent disruptions of similar materials revealed to us by laboratory practice, enabling such masters of our craft as Emil Fischer to isolate the resultant individuals. Concurrently with such analyses, however, there proceed syntheses which we can scarcely visualise, much less imitate. The perpetual elaboration of fatty acids from carbohydrates, of proteins from amino-acids, of zymogens and hormones as practised by the living body are beyond the present comprehension of the biochemist; but their recognition is his delight, and the hope of ultimately realising such marvels provides the dazzling goal towards which his efforts are directed.

Vegetable Alkaloids

The wonderful power which plants exercise in building up their tissues from carbonic acid, water and nitrogen, contrasted with the powerlessness of animals to utilise these building materials until they have been already assembled by plants, is a phenomenon too fundamental and illuminating to be withheld, as it now is, from all but the few. For by its operation the delicate green carpet, which we all delight in following through the annual process of covering the fields with golden corn, is accomplishing throughout the summer months a vast chemical synthesis of starch for our benefit. Through the tiny pores in those tender blades are circulating freely the gases of the atmosphere, and from those gases this very tangible and important white solid compound is being elaborated. The chemist cannot do this. Plants accomplish it by their most conspicuous feature, greenness, which enables them to put solar energy into cold storage; they are accumulating fuel for subsequent development of bodily heat energy. Side by side with starch, however, these unadvertised silent chemical agencies elaborate molecules even more imposing, in which nitrogen is interwoven with the elements of starch, and thus are produced the vegetable alkaloids.

In this province the chemist has been more fortunate, and successive generations of students have been instructed in the synthesis of piperine, coniine, trigonelline, nicotine, and extensions from the artificial production of tropine; but until quite recently his methods have been hopelessly divergent from those of the plant.

The Nucleic Acids

Owing to the venerable position occupied by alkaloids in the systematic development of chemical science, and to the success which has attended elucidation of their structure, many of us have become callous to the perpetual mystery of their elaboration. Those who seek fresh wonders, however, need only turn to the nucleic acids in order to satisfy their curiosity. For in the nucleic acid of yeast the chemist finds a definite entity forming a landmark in the path of metabolic procedure, a connecting link between the undefined molecules of living protein and the crystallisable products of katabolic disintegration.

Whilst the yeast cell and the wheat embryo have the power to synthesise nucleic acid, the thymus gland elaborates another nucleic acid in which a hexose is substituted for *d*-ribose, and uracil is replaced by thymine, its methyl derivative (5-methyl-2 : 6-dioxypyrimidine); the order and mode of nucleotide linkage are also different. These nucleic acids, although deriving their carbohydrate and phosphoric acid from the nourishment on which the organism thrives, do not owe the purine factors to the same source; in other words, the tissues must have power to synthesise a purine ring. The mechanism by which they exercise this power is one of the many problems which await elucidation, but arginine (*α*-amino-*δ*-guanidinevaleric acid) has been indicated as one possible origin.

Localising Enzymes

Considerable progress has been made in localising the various enzymes among the organs of the body, particularly those of animals. Into the results of these inquiries it is not the purpose of this address to enter further than to indicate that they reveal a marvellous distribution, throughout the organism, of materials able to exert at the proper moment those chemical activities appropriate to the changes which they are required to effect. The contemplation of such a system continuously, and in health unerringly, completing a series of chemical changes so numerous and so diverse, must produce in

every thoughtful mind a sensation of humble amazement. The aspect of this miraculous organisation which requires most to be emphasised, however, is that an appreciation of its complex beauty can be gained only by those to whom at least the elements of a training in chemistry have been vouchsafed."

Chlorophyll and Hæmoglobin

To those who delight in tracing unity among the bewildering intricacies of natural processes, and by patient comparison of superficially dissimilar materials triumphantly to reveal continuity in the discontinuous, there is encouragement to be found in the relationship between chlorophyll and hæmoglobin. Even the most detached and cynical observer of human failings must glow with a sense of worship when he perceives this relationship, and thus brings himself to acknowledge the commonest of green plants among his kindred. Because, just as every moment of his existence depends upon the successful performance of its chemical duties by the hæmoglobin of his blood corpuscles, so the life and growth of green plants hinge on the transformations of chlorophyll.

This is not an occasion to follow, otherwise than in the barest outline, the course of laboratory disintegration to which the chlorophyll molecules have been subjected by the controlled attack of alkalis and acids. The former agents reveal chlorophyll in the twofold character of a lactam and a dicarboxylic ester of methyl alcohol and phytol, an unsaturated primary alcohol, $C_{20}H_{39}OH$, of which the constitution remains obscure in spite of detailed investigation of its derivatives; but the residual complex, representing two-thirds of the original molecule, has been carefully dissected. The various forms of this residual complex, when produced by the action of alkalis on chlorophyll, have been called "phyllins"; they are carboxylic acids of nitrogenous ring-systems, which retain magnesium in direct combination with nitrogen. The porphyrins are the corresponding products arising by the action of acids; they are carboxylic acids of the same nitrogenous ring-systems from which the magnesium has been removed.

Blossom Chemistry

To the countless host of flower-lovers it is probable that Grasse is the only connecting-link between chemistry and their cherished blossoms, they being dimly aware that the ingredients of some natural perfumes have been imitated in the laboratory. The circumstance that identical products of change are generated by the plant, however, and form but one section of the numberless chemical elaborations which proceed before their eyes escapes them because it has been ordained that chemistry is to occupy a backwater in the flood of knowledge. Let us hope that before another century has passed this additional charm to the solace of a garden may be made more generally accessible.

Even to chemists it is only during the last decade that the mechanism of blossom-chemistry has been revealed. The subject has indeed excited their attention since an early period in the history of the organic branch, and the existing class-name for blossom-pigments was first used by Marquart in 1835 to distinguish blue colouring-matters occurring in flowers. It is also interesting to us to notice that in the following year Dr. Hope, who presided over the birth of the Chemistry Section at the Edinburgh meeting in 1834, described experiments conducted with blossoms representing many different orders, and devised a classification of the pigments which they contain. The recognition of glucosides amongst the anthocyans appears to have been first made as recently as 1894, by Heise; about that period, also, it gradually became clear that the various colours assumed by flowers are not variations of a single substance common to all, but arise from a considerable number of non-nitrogenous pigments. Prior to 1913 the most fruitful attempt to isolate a colouring-matter from blossoms in quantity sufficient for detailed examination had been made by Grafe (1911), but the conclusions to which it led were inaccurate. In the year mentioned, however, Willstätter began to publish with numerous collaborators a series of investigations, extending over the next three years, which have brought the subject within the realm of systematic chemistry. For the purpose of distinguishing glucosidic and non-glucosidic anthocyans the names anthocyanin and anthocyanidin respectively were applied. The experimental separation of anthocyanins from anthocyanidins was effected by partition between amyl alcohol and dilute mineral acid, the latter retaining the diglucosidic anthocyanins in the form of oxonium salts and leaving the anthocyanidins quantitatively in the amyl alcohol, from which they are not removed by further agitation with dilute acid; the monoglucosidic anthocyanins were found in both media, but left the amyl alcohol when offered fresh portions of dilute acid.

The earliest of these papers, published in conjunction with A. E. Everest, dealt with cornflower pigments, and indicated that the distinct shades of colour presented by different parts of the flower are caused by various derivatives of one substance; thus the blue form is the potassium derivative of a violet compound which is convertible into the red form by oxonium salt-formation with a mineral or plant acid. Moreover, as found in blossoms, the chromogen was observed to be combined with two molecular proportions of glucose and was isolated as crystalline cyanin chloride; hydrolysis removed the sugar and gave cyanidin chloride, also crystalline. Applying these methods more generally, Willstätter and his other collaborators have examined the chromogens which decorate the petals of rose, larkspur, hollyhock, geranium, salvia, chrysanthemum, gladiolus, ribes, tulip, zinnia, pansy, petunia, poppy, and aster, whilst the fruitskins of whortleberry, bilberry, cranberry and cherry, plum, grape, and sloe have also been made to yield the pigment to which their characteristic appearance is due.

Micro-Biochemistry

Amongst the many sources of pleasure to be found in contemplating the wonders of the universe, and denied to those untrained in scientific principles, is an appreciation of infra-minute quantities of matter. It may be urged by some that within the limits of vision imposed by telescope and microscope, ample material exists to satisfy the curiosity of all reasonable people, but the appetite of scientific inquiry is insatiable, and chemistry alone, organic, inorganic, and physical, offers an instrument by which the investigation of basal changes may be carried to regions beyond those encompassed by the astronomer and the microscopist.

The strict definition of chemical tasks allotted to yeasts, moulds, and bacteria suggests an elaborate system of microbial trades-unionism. E. C. Grey (1918) found that *Bacillus coli communis* will, in presence of calcium carbonate, completely ferment 40 times its own weight of glucose in 48 hours, and later (1920) exhibited the three-fold character of the changes involved which produce (1) lactic acid, (2) alcohol with acetic and succinic acids, (3) formic acid, carbon dioxide, and hydrogen. Still more recent extension of this inquiry by Grey and E. G. Young (1921) has shown that the course of such changes will depend on the previous experience of the microbe. When its immediate past history is anærobic, fermentation under anærobic conditions yields very little or no lactic acid and greatly diminishes the production of succinic acid, whilst acetic acid appears in its place; admission of oxygen during fermentation increases the formation of lactic, acetic, and succinic acids, diminishes the formation of hydrogen, carbon dioxide, and formic acid, but leaves the quantity of alcohol unchanged.

Photosynthesis

Beyond a placid acceptance of the more obvious benefits of sunshine, the great majority of educated people have no real conception of the sun's contribution to their existence. What proportion of those who daily use the metropolitan system of tube-railways, for instance, could trace the connexion between their progress and the sun? Very moderate instruction comprising the elements of chemistry and energy would enable most of us to apprehend this modern wonder, contemplation of which might help to alleviate the distresses and exasperation of the crush-hours.

For many years past, the problem connected with solar influence which has most intrigued the chemist is to unfold the mechanism enabling green plants to assimilate nitrogen and carbon. Although atmospheric nitrogen has long been recognised as the ultimate supply of that element from which phyto-protoplasm is constructed, modern investigation has indicated as necessary a stage involving association of combined nitrogen with the soil prior to absorption of nitrogen compounds by the roots, with or without bacterial co-operation. Concurrently, the agency by which green plants assimilate carbon is believed to be chlorophyll, operating under solar influence by some such mechanism as has been indicated in a preceding section.

Somewhat revolutionary views on these two points have lately been expressed by Benjamin Moore, and require the strictest examination, not merely owing to the fundamental importance of an accurate solution being reached, but also on account of the manner in which he presents the problem.

The earliest experiments were directed towards the synthesis of simple organic materials by a transformation of light energy under the influence of inorganic colloids, and indicated that formaldehyde is produced when carbon dioxide passes into uranium or ferric hydroxide sols exposed to sunlight or the mercury arc lamp. Moore declares that, although since the days of de Saussure (1804) chlorophyll has been regarded as the fundamental agent in the photosynthesis of living matter, there is no experimental evidence that the primary agent may not be contained in the colourless part of the chloroplast, chlorophyll thus being the result of a later synthetic stage. "The function of the chlorophyll may be a protective one to the chloroplast when exposed to light, it may be a light screen as has been suggested by Pringsheim, or it may be concerned in condensations and polymerisations subsequent to the first act of synthesis with production of formaldehyde" (p. 55). In this connexion it is significant that chlorosis of green plants will follow a deficiency of iron even in presence of sunlight (Molisch, 1892), and that development of chlorophyll can be restored by supplying this deficiency, although iron is not a component of the chlorophyll molecule; moreover, green leaves etiolated by darkness and then exposed to light regain their chlorophyll.

Salvaging Civilisation

In "The Salvaging of Civilisation," H. G. Wells has lately directed the attention of thoughtful people to the imperative need of reconstructing our outlook on life. Convinced that the state-motive which, throughout history, has intensified the self-motive, must be replaced by a world-motive if the whole fabric of civilisation is not to crumble in ruins, he endeavours to substitute for a League of Nations the conception of a World State. Nature ignored or misunderstood is the enemy of man; nature studied and controlled is his friend. Surely it is the nature-motive, as distinct from the state-motive or the world-motive, which alone can salvage civilisation. Before long, dire necessity will have impelled mankind to some such course. The demand for wheat by increasing populations, the rapidly diminishing supplies of timber, the wasteful ravages of insect pests, the less obvious, but more insidious depredations of our microscopic enemies, and the blood-curdling fact that a day must dawn when the last ton of coal and the last gallon of oil have been consumed, are all circumstances which, at present recognised by a small number of individuals comprising the scientific community, must inevitably thrust themselves upon mankind collectively. In the campaign which then will follow, chemistry must occupy a prominent place because it is this branch of science which deals with matter more intimately than any other, revealing its properties, its transformations, its application to existing needs, and its response to new demands. Yet the majority of our people are denied the elements of chemistry in their training, and thus grow to manhood without the slightest real understanding of their bodily processes and composition, of the wizardry by which living things contribute to their nourishment and to their æsthetic enjoyment of life.

It should not be impossible to bring into the general scheme of secondary education a sufficiency of chemical, physical, mechanical, and biological principles to render every boy and girl of 16 possessing average intelligence at least accessible by an explanation of modern discoveries. One fallacy of the present system is to assume that relative proficiency in the inorganic branch must be attained before approaching organic chemistry. From the standpoint of correlating scholastic knowledge with the common experiences and contacts of daily life this is quite illogical.

Realisation of such an ideal would people the ordered communities with a public alive to the verities, as distinct from irrelevancies of life, and apprehensive of the ultimate danger with which civilisation is threatened. The quivering glint of massed bluebells in broken sunshine, the joyous radiance of young beech-leaves against the stately cedar, the perfume of hawthorn in the twilight, the florid majesty of rhododendron, the fragrant simplicity of lilac, periodically gladden the most careless heart and the least reverent spirit; but to the chemist they breathe an added message, the assurance that a new season of refreshment has dawned upon the world, and that those delicate syntheses, into the mystery of which it is his happy privilege to penetrate, once again are working their inimitable miracles in the laboratory of the living organism.

Engineering Exhibition

Interesting Display of Machinery at Olympia

AFTER the unprecedented success of the last Shipping, Engineering and Machinery Exhibition held at Olympia in 1919 it was considered desirable that a further exhibition of a similar character, recording the progress which has since been made, would prove popular. The result is that the Exhibition, which was opened on Wednesday and which will remain open until September 28, has a representative attendance of over 300 exhibitors. The exhibition will be open from 11 a.m. to 9 p.m. daily, the price of admission being 1s. 3d., including tax.

Considerations of space prevent extended reference being made to the exhibits this week, but a fuller review will appear in the next issue of THE CHEMICAL AGE. Among the stands of interest to chemists and chemical engineers are those of Boulton & Paul, Ltd.; John Thompson Water Tube Boilers, Ltd.; the Premier Electric Welding Co., Ltd.; the Delta Metal Co., Ltd.; Worthington-Simpson, Ltd.; Texaco Petroleum Products, Ltd.; the Alloy Welding Processes, Ltd.; the Wailes-Dove Bitumastic, Ltd.; Industrial Waste Eliminators, Ltd.; the Budenberg Gauge Co., Ltd.; J. J. Allen & Co.; F. Brook, Ltd.; Evershed & Vignoles, Ltd.; Ronald Trist & Co., Ltd.; Foamite Firefoam, Ltd.; Major, Robinson & Co., Ltd.; Graphite Products, Ltd.; James Walker & Co., Ltd.; the British Oxygen Co., Ltd.; the London Electric Firm; Sozol, Ltd.; Spencer, Bonecourt, Ltd.; Automatic & Electric Furnaces, Ltd.; Theo & Co.; Carbic, Ltd.; James Pitkin & Co., Ltd.; Ozonair, Ltd.; the British Arc Welding Co., Ltd.; Airostyle & Lithos, Ltd.; Messrs. Pooley & Austin; W. R. Patents, Ltd.; Hancock & Co. (Engineers), Ltd.; Empire Runways, Ltd.; E. Green & Son, Ltd.; Matthew Keenan & Co., Ltd.; the Anglo-American Oil Co., Ltd.; the Thorn & Hoddle Acetylene Co., Ltd.; Babcock & Wilcox, Ltd.; the Unchokeable Pump, Ltd.; Cuirass Products, Ltd.; the Atlas Preservative Co., Ltd.; the Igranic Electric Co., Ltd.; W. & T. Avery, Ltd.; the Hoyt Metal Co. of Great Britain, Ltd.; Thos. Ash & Co., Ltd.; the Dissolved Acetylene Co., Ltd.; Metal Powders, Ltd.; the Aerograph Co., Ltd.; British Electric Vehicles, Ltd.; British Petroleum Co., Ltd.; Cambridge & Paul Instrument Co., Ltd.; W. H. Dorman & Co., Ltd.; Kennicott Wake Softener Co.; London Mica & General Supply Co., Ltd.; and the Victory Pipe Joint Co., Ltd.

The numerous trade journals, scientific and technical books, trade directories, &c., published by Benn Brothers, Ltd., 8, Bouverie Street, London, E.C.4, will be well to the fore at this important exhibition, and our readers are cordially invited to visit the stand, which is No. 316 in the Gallery, next to the band. Copies of THE CHEMICAL AGE, *The Electrician*, *The Gas World*, *The Export World and Commercial Intelligence*, and other technical and trade journals published by the firm, may be inspected and subscriptions ordered. Among the books on sale should be mentioned: "Benzol: Its Recovery, Rectification and Use," by S. E. Whitehead; "Electric Blasting Apparatus and Explosives," by W. Maurice, M.I.Min.E., A.M.I.E.E.; "Electro-Chemistry," by Dr. G. Gore; "Automatic Telephone Systems," a manual in two volumes by William Aitken, M.I.E.E., A.Am.I.E.E., as well as the latest edition of the "Electrical Trades Directory."

American Chemist Imprisoned in Germany

ACCORDING to a report from Berlin, Dr. N. E. Van Stone, chemical director of the Sherwin-Williams Co., of Chicago, was recently charged before the Frankenthal Criminal Court with committing commercial espionage. Apparently Dr. Van Stone went to Germany in June last and visited a number of chemical works there. In the proceedings he was accused of having approached a chemist of the Badische Anilin u. Sodafabrik with a view to obtaining trade secrets from him. Dr. Van Stone was sentenced to four months' imprisonment.

The New Victaulic Pipe Joint

Some Notes on the Hele-Shaw and Tribe Invention

WHEN Dr. H. S. Hele-Shaw was explaining last week to a number of invited guests the principles of the new Victaulic Pipe-Joint, he claimed it to be nothing less than a revolution. This cannot, in the circumstances, be considered extravagant, for the inventors, Dr. Hele-Smith and Mr. Tribe, are confident that their system provides a flexible and, at the same time, perfectly secure joint, whether under low or high pressure or vacuum, and that in simplicity of design and construction and also in appearance it marks a great advance on anything known to current practice. As very often happens with inventions which change the existing fashions of practice, these results are attained by very simple means. The common idea in the construction of a pipe joint is to draw

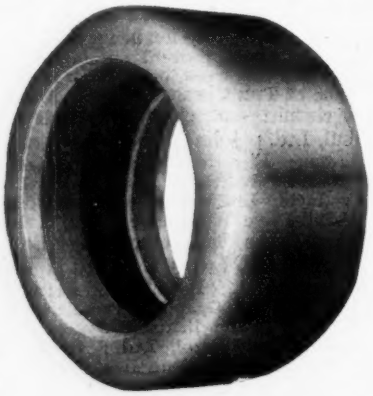


FIG. 1.—LEAK-PROOF RING OF FLEXIBLE MATERIAL.

together the two ends to be connected, so as to compress some soft material to form a packing, and thereby prevent leakage of the contained fluid. On this principle it follows that the two ends have to be pressed together with a force which has to be increased according to the pressure of the fluid. Rigidity is an essential feature of such a joint, and the possibility of expansion and contraction is practically eliminated.

Dr. Hele-Smith and Mr. Tribe, who were at work on the problem of a flexible joint during the war, approach it from another point of view altogether. They begin by making no actual joint between the two pipe ends, but leaving them

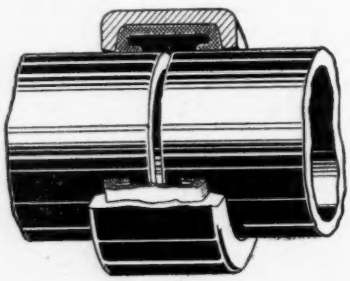


FIG. 2.—A PERSPECTIVE VIEW SHOWING A FLOATING TYPE "A" JOINT IN POSITION ON THE PIPES.
The joint is shown partly sectioned and partly broken in order to make clear its construction.

slightly apart. The ends are connected by being inserted into an elastic circular ring, as shown in Fig. 1 The conical shape of the lips of the ring provides for a natural pressure on the pipe ends, but high pressure is provided for by an adaptation of the U washer principle. This elastic self-contained ring contains a cavity into which the fluid from the pipes flows in the first instance. This cavity is so constructed that the fluid escaping into it from the pipes in the first instance only presses the containing cover the more firmly upon the pipes. The greater the pressure, therefore, the firmer the grip; the leakage within the covering ring, by pressing the lips more firmly round the pipe ends, increases the guarantee against leakage. The effect, in a word, is self-sealing. The flexible cover uniting the pipe ends is enclosed in a metal shell, easily and quickly adjustable, and a very simple and neat joint is the result.

The guests of the Victory Pipe Joint Co., Ltd., at their offices at 28, Victoria Street, S.W., last week had a number of demonstrations made. The joint in the case of a pipe of about 2 in. diameter was put together in a few minutes by a non-technical man, and as easily taken to pieces again. Specimen joints were subjected to high-pressure and to vacuum and showed no trace of weakness. As an example of ease of manipulation it was stated that in a petrol line 10 in. diameter for one of the leading oil companies, the first victaulic joint on the job was fitted in 1½ minutes by a fitter without any previous instructions or practice. The time taken over the flanged joints of the same size, year in and year out, averaged half an hour each.

The Victaulic joint is intended for all uses where flexibility and strength are required. The flexible covering which constitutes the joint, however, is composed of materials of different composition according to the purpose in view. Thus, for water pipes it is of rubber, but for use on pipes which convey benzol, steam, oil, petrol, chemicals or corrosive gases especially prepared grades of "Victaulite" are employed. Victaulic joints, it is stated, have been supplied to resist milk of lime, ammonia gas, hydrogen sulphide, cyanides, hydrocyanic acid gas, sulphuric compounds and impurities, in some cases alternating from one re-agent to another. The company are, therefore, hoping that their production will be of great interest to all concerned in chemical works.

The Victory Pipe Joint Co., Ltd., have arranged to give, at their Stand No. 119 at the Engineering Exhibition at Olympia, half-hourly demonstrations to show the ease and rapidity of fitting and dismantling the "Victaulic" Joint. Two of the Company's staff of Civil Engineers—Mr. Reginald Brown, M.Inst.C.E., M.I.M.E., President I.Mun.E., &c., and Mr. Charles Musker, M.Inst.C.E., M.I.M.E., will be present at the Stand during the whole of the Exhibition, and will be glad to meet there all who are interested in the use of the pipe joint and the various other applications of the Victaulic system.

Celluloid Safety Rules

THE Home Secretary proposes to make regulations under the provisions of the Factory and Workshop Act, 1901, relating to dangerous and unhealthy industries, dealing with places in which celluloid, or any article wholly or partly made of celluloid, is manufactured, manipulated, or stored. The draft regulations, to which objections may be submitted before September 20, provide, *inter alia*:—

Stocks of celluloid shall be kept in a suitable place, outside the workrooms, plainly marked "celluloid store." Stocks exceeding one hundred-weight shall only be kept in a chamber constructed of fire-resisting materials, in which no open light or fire shall be allowed, and which shall not be used for any purpose other than the storage of celluloid.

The store shall not be situated so as to endanger the means of escape from the factory or workshop or from any part thereof in the event of a fire occurring in the store.

The amount of celluloid in a workroom at any one time shall be kept as small as is practicable without unduly interfering with the work carried on.

Efficient steps shall be taken to prevent celluloid from coming into contact with open lights or fires, or, except to the extent that may be necessary for the processes of the industry, remaining near thereto.

Adequate means for extinguishing fire, having regard to the amount of celluloid present in the room at any one time, shall be kept constantly provided for each workroom and store-room. Adequate means of escape in case of fire shall be provided. Persons working in a "dark-room" shall be instructed as to the means of escape from such room.

From Week to Week

Considerable damage was caused by fire on Wednesday night at the premises of Messrs. Stern & Slutsky, rubber manufacturers, Cannon Street Road, London, E.

An Exchange message from Stockholm states that the Rosta Agency there has published a message from Moscow announcing that Professor Valgis has succeeded in obtaining GAS FROM SLATE.

According to a cable received by the Acting High Commissioner for Australia, a Tasmanian company is preparing to develop an OIL SHALE holding, with an estimated crude oil content of 240,000,000 gallons.

SENATOR PATERNO is the newly elected president of the National Council for Chemistry which has been organised by the Italian Society for General and Applied Chemistry and the Association of Italian Chemical Industries.

A report on the MINERAL PRODUCTION OF THE PHILIPPINE ISLANDS in 1920 has been received from the British Consulate-General at Manila and may be inspected by interested parties on application to the Dept. of Overseas Trade, 35, Old Queen Street, S.W.1.

We understand that Mr. T. M. C. STEUART, of 65, Bishopsgate, E.C., has joined the board of the Scarab Oil Burning Co., Ltd., The registered office of the company has been transferred to the offices of the Ethelburga Syndicate, Ltd. at the same address.

The death occurred on September 2 at Woodlands Hall, near Consett, of Mr. WILLIAM BREWIS VON HAANSBERGEN. He played a prominent part in the development of Tangdale's Chemical Manure Works, and was a director of Lowes' Chemical Manure Company. He was 78 years old.

A. Milne & Co., Ltd., of Dyce, have set up plant for the MANUFACTURE OF SULPHURIC ACID. Up to the present, Messrs. Milne have obtained their supplies from Aberdeen, Glasgow and Forres, but they now propose to manufacture this acid not only for their own use but for public sale generally.

According to a recent dispatch from Berlin 419,000 metric tons of POTASH were sold in Germany between January 1 and July 31, 1921. It is reported that the inland prices received did not cover the cost of production, and that the profits on foreign sales of the same material were less than in the like period of 1920.

Mr J. C. MONTGOMERIE, the engineer of the Anglo-Maikop Corporation, Ltd., and associated companies, who is proceeding to the Caucasus in connexion with the negotiations between that group and the Soviet Government, reached Moscow on August 26, and, according to advices from him, was leaving Moscow for the South on the 30th.

The secretary of the Rubber Growers' Association has issued a circular as follows: "With reference to my circular dated July 15, and the scheme for a Rubber Producers' Corporation, I am directed to request all producers who are in favour of the scheme, and who have not yet sent in their provisional assent, to do so before September 24 next."

A new method of CALCINING HYDRO-MAGNESITE is reported to have been discovered by Mr. C. D. Oliver, of Vancouver. The first deposit of this product, of which British Columbia has a monopoly, is at Watson Lake, near Vancouver. Other parts of central and northern British Columbia are said to be rich with the same and similar deposits. It is further stated that the new method of calcining has been proved to be an undoubted success, and that this will obviate the necessity of importing improved magnesite from California and elsewhere.

According to a report of the Agence Economique et Financière, ALSATIAN POTASH cannot compete in Scandinavia with the German potash. The Alsatian potash used to be exported *via* Antwerp or Rotterdam, while the German potash was embarked in Hamburgh or Bremen, with the result that German potash pays an incomparably lower freight than Alsatian potash. It is thought probable, however, that after the re-establishment of normal circumstances there will be strong competition between the potash producers of France and Germany.

On the invitation of the Institute of Brewing a party of hop-growers in Kent on September 2 visited the Institute's RESEARCH STATION AT EAST MALLING, and Messrs. Whitbread's hop-gardens at Beltring, at which experimental kilns have been built by the Institute. As previously announced in THE CHEMICAL AGE, a large scheme is being organised and financed by the Institute to study the fundamental principles underlying the various processes of manufacture obtaining in the fermentation industries generally, and the brewing industry in particular.

A telegram from the Commercial Secretary to His Majesty's Legation at Buenos Aires states that the State Railways are INVITING TENDERS for one year's supply of chemicals (tenders close October 17), paints and varnishes (tenders close October 18), and glass (tenders close October 24). Tenders must be presented through a local agent, but it will be preferable to quote local merchants. A copy of the relative specifications cannot be expected in the Department of Overseas Trade before the arrival of the ordinary mail at the end of September.

By order of the Disposal Board, it was announced recently, Glasgow firms have been instructed to dispose of the huge stock of machinery and plant now lying in disuse in the munition towns of Georgetown (near Glasgow), Gretna Green, and in a less degree at Irvine (Ayrshire) and Shandon (River Clyde). The plant will be offered at auction during the early weeks of September. The approaching disposal of the GRETNA GREEN FACTORY, which covered about 4,300 acres, had already been announced by Sir Howard Frank, as reported in THE CHEMICAL AGE, of August 27.

LEWIS BERGER & SONS, LTD., colour, paint and varnish manufacturers, are asking for power to add to the objects of the company the businesses of manufacturing and dealing in paints, varnish, insecticides, kegs, drums, tin cans, packing cases and casks, corroders of white lead, and also the businesses of manufacturing and dealing in aniline dyes and intermediates, lithopone and chemical substances, and the business of coal tar distillers and of manufacturing and dealing in any derivatives of coal tar, and packages or containers of all kinds for any of the said manufactures.

Following the annual general meeting of the Governors of ARMSTRONG COLLEGE, NEWCASTLE, on October 3, an extraordinary general meeting will be held at which a resolution to substitute the following Article for Article 66 will be submitted for approval. The new Article, it is proposed shall be: "The Council shall invest the moneys from time to time belonging to the College and not required to be immediately applied for the purposes of the College in the name of the College in any investments authorised by statute for the time being as trustee investments, and from time to time may vary or realise such investments."

The Controller of the Clearing Office (Enemy Debts), in view of agreements between the British Government and the Belgian and French Governments, which are now awaiting ratification, and which apply the procedure under Article 296 of the Treaty of Versailles relating to PRE-WAR DEBTS to the claims of French and Belgian nationals resident in this country on January 10, 1920, desires to receive at the earliest possible moment the names and addresses of such claimants, together with the amounts of their claims. These claims must be confined to debts against German Nationals as defined by the Article. A copy of the Treaty of Peace Order, 1919, containing the text of the Article may be obtained, price 2d., from H.M. Stationery Office, Imperial House, Kingsway, London, W.C. 2.

The Edinburgh Senatus Academicus have decided to hold a special graduation ceremony next Tuesday, when, as a compliment to the British Association, the following will receive the HONORARY DEGREE of Doctor of Laws: Professor Arrhenius, Director of the Physico-Chemical Department of the Nobel Institute in Stockholm; Professor Kapteyn, Professor of Astronomy at Groningen; Professor Krogh, Nobel Laureate Professor of Physiology at Copenhagen; Dr. Irving Langmuir, Schenectady, New York; Sir Oliver Lodge, late Principal of the University of Birmingham; Sir William Ridgeway, Professor of Archæology at Cambridge; Sir Edward Thorpe, President of the British Association; Professor Volterra, Professor of Mathematical Physics at Rome; and Professor R. W. Wood, Professor of Experimental Physics in Johns Hopkins University, Baltimore.

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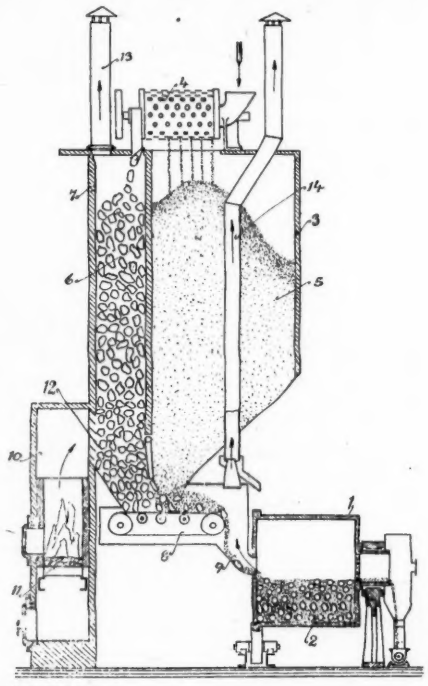
Abstracts of Complete Specifications

160,423. DRYING MATERIAL TO BE GROUND IN REVOLVING DRUMS, APPARATUS FOR. J. S. Fasting, 9, Monrads Alle, Valby, Denmark. International Convention date, March 22, 1920.

When moist material is ground in revolving drums, difficulties are experienced owing to the cohesion and plasticity of the material which involves long grinding and high consumption of power, while if the material is previously dried by hot air in drums, the air is not easily passed through it owing to the finely divided particles filling the spaces. The invention avoids these difficulties. The material is fed into a rotary sifter, 4, so that the finer portion is delivered into a vertical shaft, 3, and the coarser portion into a shaft, 7. A furnace, 10, is arranged at the side of the shaft, and the hot gases pass through the damper, 12, into the coarse material, 6, only, and thence to the outlet, 13. The coarse material is thus heated and dried, and on mixing with the fine material on the conveyor, 8, the latter material is also dried by the heat given off from the coarse material. The mixture then passes to the grinding drum, 1. In a modified construction the grinding balls are discharged from the drum, 1, with the ground material, separated, and supplied to the top of the shaft, 7, to be heated. The material is thus dried by the hot grinding balls.



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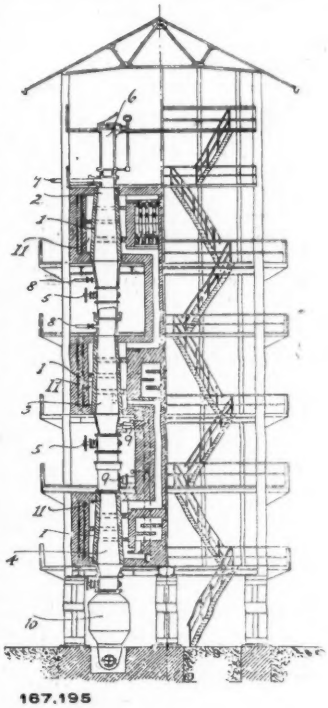
167,195. DECOLORISING CARBON, PROCESS OF PRODUCING. J. N. A. Sauer, 43, Johannes Verhulstraat, Amsterdam, Holland. Application date, June 11, 1919.

Decolorising carbon is produced from raw or partly carbonised carbonaceous material such as wood, peat or the like in a single retort or in a number of retorts connected in series so that the material passes successively through a series of zones of increasing temperatures. Gas is introduced into the charge and distillation products are withdrawn from it in such a way that endothermic reactions are confined to the zones preceding the highest temperature zone. The raw material, may be used in a dry or wet state and may first be treated with steam or water or with acids, alkalies or with other solutions, by which it is mixed with calcium, magnesium or zinc chloride, lime, carbonate of soda, caustic soda or potash, starch, &c. The gas evolved at any stage of the process may be used for heating the retort. Gases such as air, steam, carbon dioxide carbon monoxide, or chlorine may be introduced in a heated state and at atmospheric or higher pressure. The introduction of these gases determines the nature of the by-product obtained, *e.g.*, the introduction of steam produces a high yield of ammonia. These gases are not introduced in the final high temperature stage, with the exception of chlorine which does not produce endothermic reactions, but assists in the formation of pure carbon. The raw material is charged from the hopper 6 into the uppermost zone 2 from which it passes downwards through slides or valves 5 to the second zone 3, and similarly to the final zone 4. Gases or vapours are introduced through pipes 8 into various parts of the system and the products of distillation are withdrawn through the pipe 7. Retort gases are drawn off through the pipes 9 and the final product (decolorising carbon) is withdrawn into the chamber 10. Distillation is effected in the zone 2 at a temperature of about 600° C., carbonisation is effected in the chamber 3 at a temperature of about 1,200° C., and the final burning of the carbon is effected in the zone 4 at a temperature of about 1,500° C. The zones 2, 3 and 4 may be further sub-divided by additional slides or valves to regulate the progress of the material. The retort gases drawn off through the pipes 9 may be mixed with air and used in the combustion chambers 11 for heating the retort. In a modified apparatus the three stages of the process take place in a retort which is not divided horizontally, but which has a vertical partition near one side forming a duct through which a pipe passes for introducing gas into the retort at the desired levels. Apertures are provided in the partition through which retort gases are discharged into the duct. Another modification is described in which the apertures in the partition are provided with means by which they may be partly closed.



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In another modification a pipe is provided for introducing steam into the middle zone of the retort. An arrangement is also described in which retorts are arranged in pairs side by side and recuperators are provided for heating the air supply for delivery to the combustion chambers.

167,199. VISCOSE, PROCESS FOR TREATMENT OF. C. L. Stulemeyer, Breda, Holland. Application date, January 22, 1920.

In the preparation of viscose from cellulose the cellulose is soaked in caustic alkali for about 1½ hours. This soaking is necessary in order to avoid the presence of undissolved cellulose fibres which would interfere with the subsequent filtration. It is now found that the penetration of the caustic alkali is hindered by the presence of air in the fibres. The time of treatment with caustic alkali may be reduced to about ½ hour if the cellulose is previously placed in a vessel under a vacuum of about 1 lb. per sq. in. and the alkali then admitted.

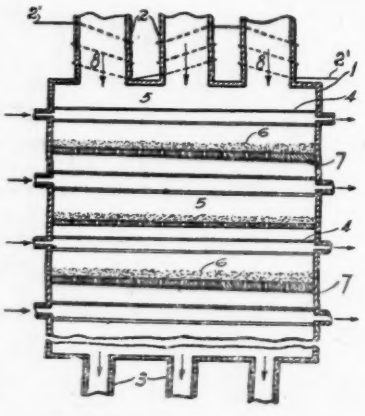
167,201. VISCOSE, PROCESS FOR MAKING. C. L. Stulemeyer, Breda, Holland. Application date, February 2, 1920. Addition to 167,199.

In the process for making viscose as described in Specification No. 167,199 (see above) it is found that the time of treat-

ment with caustic soda may be still further reduced by first subjecting the cellulose to a vacuum and then to a pressure of 3–4 atmospheres in contact with the caustic alkali solution.

167,219. CATALYTIC OXIDATION, PROCESS OF. H. Wade, London. (From The Barrett Co., 17, Battery Place, New York). Application date, April 1, 1920.

The process is more particularly for the catalytic oxidation of aromatic hydrocarbons. It is known that some chemical reactions particularly the oxidation of aromatic hydrocarbons in the vapour phase by gaseous oxygen are liable to develop so much heat that the oxidised product is decomposed and the products of complete combustion are formed. A large proportion of the heat developed is transferred to the catalyst, the temperature of which must therefore be controlled. This is effected by passing the gas mixture through porous partitions formed of thin layers of the catalyst alternately with cooling elements consisting of tubular coils, grids or radiators. The reaction mixture is preheated in the inlet passages 2 and passes into the chamber 1 which is divided into compartments 5. The catalyst 6 is supported on a porous material such as pumice, which is carried by perforated shelves 7. The cooling elements consist of coils or grids 4, through which cooling liquids or gases are circulated. The gas is finally passed through outlets 3 to any suitable condensing system. The greatest efficiency of control is obtained when the cooling devices are arranged very close to the catalyst. The apparatus is particularly suitable for the production of maleic acid by the oxidation of benzene in the presence of a catalyst such as vanadium oxide. The mixture of benzene vapour and oxygen or air is pre heated to about 400° C. in the inlet conduits 2, and is partly converted into maleic acid in passing through the first layer of catalyst, while the temperature rises due to the exothermic reaction. The temperature is reduced to 400 °C. in passing through the intermediate cooling device. The proportion of oxygen and the velocity of the reaction mixture are adjusted so that the temperature on leaving the catalyst layer is not above 450° C. The temperature in the successive compartments may be made to increase or decrease progressively by extracting more or less heat by the cooling devices.



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167,313. SULPHUR, PURIFICATION OF. Peter Spence & Sons, Ltd., H. Spence, and T. J. I. Craig, Manchester Alum Works, Manchester. Application date, May 13, 1920.

The process is for purifying sulphur by the use of aluminous materials such as alumina or bauxite as described in Specification No. 140,844 (*see* THE CHEMICAL AGE, Vol. II, p. 509). It is found that the aluminous material partly loses its activity after repeated use even when the impurities absorbed by the treatment are mainly eliminated by ignition. The material may be regenerated by igniting it, and then washing or soaking it in dilute acid for several hours. The acid may be hydrochloric acid of about 1·05 sp. gr. or sulphuric acid of about 1·08 sp. gr. and the acid may be circulated through the material at ordinary or at a higher temperature. The material is then washed, dried and ignited again. It is found that a material which has fallen to about 50 per cent. of the original activity may be restored to about 90 per cent. by this process.

NOTE.—Abstracts of the following specifications which are now accepted appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—143,550 (Nitrogen Corporation) relating to production of ammonia, *see* Vol. III, p. 162; 144,310 (W. Carpmael, Farbenfabriken vorm. F. Bayer & Co.) relating to azo dyestuffs, *see* Vol. III, p. 188; 146,287 (F. Fischer) relating to coal distillation, *see* Vol. III, p. 353; 146,936 (Mining and Metallurgical Processes Proprietary, Ltd.) relating to blast roasting operations, *see* Vol. III, p. 381; 149,648 (T. Schmiedel and H. Klencke) relating to production of sulphuric acid, *see* Vol. III, p. 543; 152,356 (Koppers Co.) relating to purification of liquids, *see* Vol. IV, p. 22; 157,850 (H. Haakh) relating to oxyarylaldehydes, *see* Vol. IV, p. 456.

International Specifications not yet Accepted

165,788. CARBON AND CHARCOAL. R. Adler, Hans Dampfschiff, Carlsbad, Czecho-Slovakia. International Convention date, July 5, 1920.

Sulphite cellulose waste liquor or sulphite alcohol waste residue is mixed with potassium or sodium chloride or an alkaline earth hydrate to precipitate organic matter, which is filtered off. The precipitate is mixed with alkali hydrates, carbonates, phosphates, or sulphates to redissolve it, and it is then carbonised. Alkali salts are dissolved out with water and carbon dioxide is passed through the solution to reproduce the carbonates for use again. The carbonised organic matter is a decolorising carbon.

165,795. CARBONISATION. H. G. Hennebutte, 62, Rue de Maubeuge, Paris, and E. Goutal, 60, Boulevard St. Michel, Paris. International Convention date, July 2, 1920.

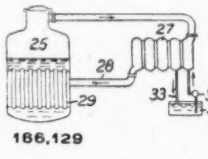
Coal, peat, or schist is distilled in three stages, at increasing temperatures. The acid products from the low-temperature stages are first absorbed in a suitable reagent, and then the basic products from the second stage in an acid reagent, and the hydrocarbons by solvents. Gas is obtained in the third stage, and is mixed with gas from the previous stages which is returned to the material.

166,095. OXIDES OF NITROGEN. Soc. Anon. l'Azote Francais, 126, Rue de Provence, Paris. International Convention date, July 5, 1920. Addition to 149,304. (*See* THE CHEMICAL AGE, Vol. III., p. 542.)

Oxides of nitrogen are extracted from mixtures containing other gases by absorption in substances such as ferric chloride, or oxide of calcium, magnesium, copper, zinc, or iron, or dehydrated bauxite, which form addition products at temperatures of 0°C. to 80°C. The absorbing material must be obtained or dehydrated at a low temperature. The oxides of nitrogen are liberated by heating the absorbent in a partial vacuum to about 100°C.

166,129. EVAPORATING LIQUIDS. Akt.-Ges. Kummler & Matter, Aarau, Switzerland. International Convention date, July 7, 1920.

Compressors which are used for dealing with acid vapours generated in evaporating liquids are protected from corrosion by injecting an alkaline substance into the vapour. Suitable substances are ammonia gas, caustic soda or potash solution, alkaline vapour from another evaporator, or magnesium oxide or carbonate powder. These substances are injected into the top of the evaporator or into the vapour pipes, and may be separated and used again until neutralised. Liquid is evaporated in the vessel, 25, and the vapour passes through the multi-stage compressor, 27, the compressed and heated vapour being forced through the heater, 29, to evaporate the liquid. The vapour is neutralised by alkaline solution from the tank, 32, which is delivered to the first stage of the compressor by the pump, 31, and withdrawn from the second stage by the pipe, 33.



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168,304. Process for boiling fibrous materials and a device for carrying out the process. Akt. Ges. Der Maschinenfabriken, Escher, Wyss & Cie. August 21, 1920.

168,308. Carburant for alcohol. Chevalier, J. M. A., Bourcet, P., and Regnault, H. August 27, 1920.

168,319. Means for injecting liquid or gaseous matter under pressure into meat and the like. Scheib, G. Ihlenfeldt, R., Kock, M., and Guntherberg, H. August 27, 1920.

168,324. Process for recovering iodine. Faber, O. von.

168,333. Explosives materials. Lundsgaard, C. J. S., and Herbst, K. T. August 28, 1920.

Specifications Accepted, with Date of Application

138,650. Sulpho-aromatic agents for the hydrolysis of fatty acid glycerides, Processes for the manufacture of. A. Godal. April 29, 1918.

141,733. Electrolytic apparatus. M. M. Merritt. April 15, 1919.

143,532. Electrical energy, storage and supply of, by an electro-chemical process. F. P. Habicht. May 17, 1919.

144,719. Electrolytic cells, Manufacture of metallic diaphragms of. R. Pechkranz. June 12, 1919.

147,703. Vat dyestuffs, Manufacture of. R. B. Ransford. (*L. Cassella & Co.*) July 8, 1920.

151,236. Carbonaceous material, Treatment of. W. E. Trent. Sept. 16, 1919.

151,278. Coke ovens. L. Wilputte. June 14, 1917.

167,789. Lubricating oil and methods of manufacturing the same. J. Harger. February 18, 1920.

167,822. Carbonaceous material, Apparatus for distilling. W. P. Perry. May 10, 1920.

167,824. Automatic analysis of gases, Recording analysing apparatus for. S. A. S. Krogh and P. H. Pedersen. May 10, 1920.

167,863. Roasting furnaces. S. Sokal. (*Allis Chalmers Manufacturing Co.*) May 19, 1920.

167,941. Alkyl-amides of aromatic sulphonic acids, Manufacture of. British Cellulose and Chemical Manufacturing Co., Ltd., W. Bader and D. A. Nightingale. July 2, 1920.

168, 010. Wet mixers. R. V. Mattison, Jun. June 18, 1920.

Applications for Patents

British Thomson-Houston Co., Ltd. (General Electric Co.) Chemical apparatus. 22,885. August 29.

Cassella & Co., L. Manufacture of salts of acridinium compounds. 23,286. September 1.

Clavel, R. Treatment of cellulose acetate or products made therewith. 22,980. August 30.

Green, A. G. and Saunders, K. H. Manufacture of colouring matters and intermediates for use therein. 22,991. August 20.

Hayes, A. Apparatus for measuring and delivering predetermined quantities of liquids. 22,867. August 29.

Hodgkinson, W. R. Treatment of earthy and metalliferous minerals. 23,219. September 1.

Melamid, M. Manufacture of fatty-acid substances from resins. 23,284, 23,003. August 30. (Germany, October 2, 1920.)

Meter, J. W. van. Portable apparatus for generating poisonous gases. 23,153. August 31. (United States, August 31, 1920.)

Peachey, S. J. and Shaw, A. H. Process for producing solid material from powdered substances. 22,942. August 30.

Pickett, F. N. Process for recovery of copper and zinc from alloys. 22,877. August 29.

Plauson, H. Extraction of oil from shale. 23,048. August 31.
" Manufacture of phosphatic manure. 23,049. August 31.

Plauson's (Parent Co.), Ltd. (Plauson). Extraction of oil from shale. 23,048. August 31.
" Manufacture of phosphatic manure. 23,049. August 31.

Ransford. R. B. (Cassella & Co.) Manufacture of salts of acridinium compounds. 23,286. September 1.

Sim, D. J. and Smith, H. E. Manufacture of lead carbonate or white lead. 23,531. September 3.

Soc. Chimique des Usines du Rhône. Process for production of organic silver alcohols. 23,391. September 2. (Germany, January 5.)

Steinhilber, H. Process for producing cellulose from cyperacaes, graninaes, and typhacaes. 23,354. September 2.

Straus, H. P. Fractionation of petroleum. 22,880. August 29.

Patents Court Cases

Applications have been made under Section 24 of the Patents and Designs Acts, 1907 and 1919, for the following Patents to be indorsed " Licences of Right " : 15,934/1912 (F. J. Brougham-Norsk Hydro-Elektrisk Kvaelstofaktieselskab) relating to a process for solidifying liquefied nitrate of lime ; 22,744/1913 (N. V. Hybinette) relating to a process for the electrolytic deposition of metals from solutions ; 22,745/1913 (N. V. Hybinette) relating to an electrolytic process for extracting copper from ores; 110,041 (A. W. C. Van Voorhout) relating to phenol aldehyde condensation products.

Application has also been made under section 20 of the Act for the restoration of lapsed patent No. 7260/1915 (C. Beindl) relating to a process for the production of hydrocyanic acid. Any notice of opposition must be given by Nov. 7, 1921.

Mr. H. Duehrssen, a director of the German Potash Syndicate, is reported to have arrived in New York to resume negotiations in regard to POTASH SUPPLIES for the fertiliser and other industries. Mr. Duehrssen was in the United States several months ago, during the course of negotiations for a 45 per cent. bonus to potash buyers. W. Forthmann, another director of the Syndicate is expected to join Mr. Duehrssen this week.

British Glass Industry

Proposed Deputation to Board of Trade

A SIGNIFICANT statement on the present position of the British glass industry was made on September 2 by Mr. W. Bradford, general financial secretary of the National Flint Glass Workers' Association, at a meeting of that body at Dudley. He stated that the illuminating and bulb sections of the trade were in a desperate state. Works at Lemington-on-Tyne, Newcastle-on-Tyne and at Ponders End (London) might close down at any time. The cause of the present situation was the importation of glassware from the Continent, and he had, he said, again approached the Board of Trade with a view to seeing what could be done under the Safeguarding of Industries' Act, and recently had had an interview with Mr. E. R. Eddison of that department. He asked that glassware from Czecho-Slovakia and Germany should be subjected to the closest investigation with a view to relieving the British trade from unfair competition. The glass trade was entitled to favourable consideration having regard to the great efforts it made during the war period by creating and maintaining an adequate supply of scientific, chemical and illuminating glassware, and Mr. Bradford recalled the fact that the Government then urged manufacturers to improve their plant so that the goods required should be forthcoming. And that was done at considerable cost. Assurance was given that after the war the trade would be protected against unfair trading, but the glass industry was in a most precarious position—worse than it had ever been. One of the Government departments had accepted the tender of an enemy country.

In his reply, Mr. Eddison pointed out that under the new legislation the Board of Trade had the power to protect an industry (other than one concerned in the manufacture of food) in respect of which it was proved that goods not manufactured in the United Kingdom were being sold or offered for sale in this country at a price which, by reason of the depreciation of value in relation to sterling of the currency of the country in which the goods were manufactured, not being a country in his Majesty's Dominions, was below the prices at which similar goods could profitably be manufactured in this country. In the event of any doubt the Board might refer the matter for inquiry to a committee constituted in accordance with the Act, but the Board was precluded from so referring any matter, unless it was fully specified that the value of the currency in question in relation to sterling was less than 333 per cent., or upwards, of the par value of the Exchange. He therefore submitted a series of questions asking for evidence supporting the contention as to the causes of the unfair competition.

Mr. Bradford stated that the Manufacturers' Association had considered the matter, and had appointed a sub-committee to meet a sub-committee of the workmen's section. These sub-committees would meet shortly, and a joint representation would then be made to the Board of Trade. The report would be conveyed to the department by a small deputation, and the trade hoped that something would soon be done to relieve the present grave position.

Publications Received

" INDUSTRIAL INDIA " is the title of a new monthly magazine devoted to the development of India's resources. It is published by the Tata Publicity Corporation, Ltd., of Bombay, whose London offices are at Kern House, Kingsway, W.C.2. It contains a science section under the direction of A. H. Haver, M.I.N.A., and K. S. Dickenson, F.C.S. This section will deal particularly with applied chemistry. The first number is dated August and is priced at Rs. 2.

We have received the first number, dated July 31, of an Italian monthly publication entitled *Bollettino degli Olii e dei Grassi*, and described as the official organ of the Experimental Station for the soap, mineral-oil, colour and varnish industries. The offices of the journal are : R. Laboratorio Olii e Grassi, Milano, Via Marina 5 (Boschetti), and the annual subscription (foreign) is lire 50.

The Pioneer Press, of Allahabad, U.P., India, send us the first (August) number of the *Indian Importer and Exporter*, the subscription rates for which are (in the British Isles) 10s. per annum. The London offices are at 10, Norfolk Street, and 11, Arundel Street, Strand, W.C.2.

Monthly Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

British Market Report

THURSDAY, September 8, 1921.

Business has been decidedly better during the past week, and the effect of the Safeguarding of Industries Act which comes into force at the end of the month is already felt, the price of many articles having hardened considerably.

Export inquiry has been fairly lively in some directions, but on the whole the turn-over might be considerably better.

General Chemicals

ACETONE is in strong demand and stocks are small.

ACID ACETIC is rather higher in price and in quite good demand.

ACID CITRIC is unchanged.

ACID FORMIC exhibits a firmer tendency, and stocks are readily saleable.

ACID OXALIC is fairly active, and has advanced considerably in price.

BARIUM CHLORIDE.—There is no further change in price, but the article is still in very small inquiry.

BLEACHING POWDER.—Certain export business is reported, but makers are far from satisfied.

FORMALDEHYDE is distinctly firmer, and a satisfactory volume of business is reported.

IRON SULPHATE is unchanged.

LEAD ACETATE.—Business continues of the hand-to-mouth type; value unchanged.

POTASSIUM CARBONATE is still in buyers' favour, and only small business can be detected.

POTASSIUM CAUSTIC continues to droop, and the market does not appear to have touched bottom.

POTASSIUM CHLORATE remains in very good demand for export. The present export price appears to be unremunerative to makers, and the low level is probably only temporary.

POTASSIUM PRUSSIATE remains in good demand for export. Makers are still sold ahead.

SODIUM ACETATE is much higher in price, and only limited stocks are available.

SODIUM BICHROMATE is distinctly steadier and an improvement in the export demand would quickly make itself felt.

SODIUM CAUSTIC is unchanged.

SODIUM HYPOSULPHITE.—A moderate business is reported at recent prices.

SODIUM NITRATE.—A few small orders have been placed, but the turnover is insignificant.

SODIUM PHOSPHATE is still inclined to favour buyers.

SODIUM PRUSSIATE is much firmer and supplies are short.

SODIUM SULPHIDE has been in fair demand, and an advance in price is probable.

Coal Tar Intermediates

There has been a little more activity during the current week and the undertone is very firm.

ALPHA NAPHTHYLAMINE is in better demand, but the price is without change.

ANILINE OIL AND SALT remain firm with a better export inquiry.

BETA NAPHTHOL is still idle, and price is easy.

DIMETHYLANILINE is quietly steady.

DINITROCHLORBENZOL.—There is a small inquiry, but there are only limited supplies offering.

DIPHENYLAMINE has been in better request, and the price is firm.

H. ACID is higher in price, and there are only limited quantities offering.

PARANITRANILINE is in better request, and the price is firm.

RESORCIN is without change.

SALICYLIC ACID is scarce and firm.

Coal Tar Products

90's BENZOL shows no change from last week. The price for prompt delivery remains firm in the region of 3s. in London and 2s. 9d. to 2s. 10d. in the North.

PURE BENZOL is also scarce and is worth about 3s. 4d. on rails.

CREOSOTE OIL is inactive and business has been done on the basis of 2s. 3d. per gallon, f.o.b., for the Pale quality, which represents about 2s. 1d. on rails. Dark is worth from 1s. 10d. to 2s.

SOLVENT NAPHTHA seems to be more plentiful, although the price remains in the region of 2s. 7d. per gallon on rails.

HEAVY NAPHTHA is quiet and is quoted at 2s. 3d. to 2s. 4d.

NAPHTHALENE is also inactive and is worth from £6 to £10 per ton for Crude qualities and from £15 to £18 per ton for refined qualities.

PITCH.—The position is unchanged and prices are slightly easier. To-day's quotations are 77s. 6d. to 80s. f.o.b., east coast and 80s. to 82s. 6d. f.o.b., London.

Sulphate of Ammonia

There are no new features to report.

French Market Report

Trade has been slightly better, and there are indications that many of the stocks in merchants' hands have now been largely liquidated, and in one or two cases already an advance in price has been registered.

ACETONE, 540 frs.
ACID ACETIC, 80 per cent., 340 frs.
ACID BORACIC, 340 frs.
ACID LACTIC, 50 per cent., 220 frs.
ACID OXALIC, 430 frs.
ALUM CHROME, 170 frs.
ALUMINA SULPHATE, 14 per cent., 70 frs.
AMMONIUM CARBONATE, 225 frs.
AMMONIUM PHOSPHATE, 330 frs.
COPPER SULPHATE, 120 frs.
IRON SULPHATE, 120 frs.
HYDROGEN PEROXIDE, 115 frs.
LEAD ACETATE, 255 frs.
LEAD NITRATE, 340 frs.
NAPHTHALENE, refined, 130 frs.
POTASSIUM BICHROMATE, 315 frs.
POTASSIUM METABISULPHITE, 500 frs.
POTASSIUM PERMANGANATE, 10 frs.
POTASSIUM PRUSSIATE, YELLOW, 550 frs.
SODIUM BICARBONATE, 100 frs.
SODIUM BICHROMATE, 265 frs.
SODIUM CAUSTIC, 76 per cent., 110 frs.
SODIUM HYPOSULPHITE, 80 frs.
SODIUM NITRITE, 335 frs.
SODIUM PHOSPHATE, 130 frs.
SODIUM PRUSSIATE, 280 frs.
All per 100 kilos.

German Market Report

Business has been extremely active, and many advances in price have taken place. The majority of factories are now fully occupied—in some cases for many months ahead—and they are disinclined to entertain fresh business except at an advance on present figures.

ACID ACETIC, 80 per cent., 12 marks.
ACID OXALIC, 17 marks.
ALUM CRYSTALS, 3 marks.
ALUMINA SULPHATE, 14 per cent., 2.50 marks.

COPPER SULPHATE, 8 marks.
CHROME ALUM, 6.50 marks.
LEAD ACETATE, 11 marks.
LITHOPONE, 6.85 marks.
MAGNESIUM CHLORIDE, 2 marks.
POTASSIUM BROMIDE, 17 marks.
POTASSIUM BICHROMATE, 14.50 marks.
POTASSIUM CAUSTIC, 8 marks.
POTASSIUM PERMANGANATE, 28 marks.
POTASSIUM PRUSSIATE, 31.50 marks.
SODIUM BICARBONATE, 2.50 marks.
SODIUM BROMIDE, 18 marks.
SODIUM CAUSTIC, 7 marks.
SODIUM SULPHIDE, concentrated, 6.50 marks.
All the above prices are per kilo.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	2	1	to	0	2	2
Acetone oil	ton	87	10	0	to	90	0	0
Acetone, pure	ton	90	0	0	to	95	0	0
Acid, Acetic, glacial, 99-100%	ton	60	10	0	to	62	10	0
Acetic, 80% pure	ton	42	0	0	to	45	0	0
Arsenic	ton	95	0	0	to	100	0	0
Boric, cryst	ton	65	0	0	to	68	0	0
Carbolic, cryst. 39-40%	lb.	0	0	6½	to	0	0	7
Citric	lb.	0	2	5	to	0	2	6
Formic, 80%	ton	65	0	0	to	67	10	0
Gallic, pure	lb.	0	4	0	to	0	4	3
Hydrofluoric	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol.	ton	35	0	0	to	37	10	0
Lactic, 60 vol.	ton	40	0	0	to	42	10	0
Nitric, 80 Tw.	ton	38	0	0	to	40	0	0
Oxalic	lb.	0	0	8	to	0	0	8½
Phosphoric, 1.5	ton	45	0	0	to	47	0	0
Pyrogallic, cryst	lb.	0	7	6	to	0	7	9
Salicylic, Technical	lb.	0	1	2	to	0	1	3
Salicylic, B.P.	lb	0	1	6	to	0	1	7
Sulphuric, 92-93%	ton	8	0	0	to	8	10	0
Tannic, commercial	lb.	0	3	6	to	0	3	9
Tartaric	lb.	0	1	4	to	0	1	5½
Alum, lump	ton	18	0	0	to	18	10	0
Alum, chrome	ton	37	10	0	to	40	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	12	0	0	to	13	0	0
Aluminium, sulphate, 17-18%	ton	15	0	0	to	16	0	0
Ammonia, anhydrous.	lb.	0	2	0	to	0	2	2
Ammonia, .880	ton	43	0	0	to	45	0	0
Ammonia, .920	ton	30	0	0	to	32	10	0
Ammonia, carbonate	lb.	0	0	4	to		—	
Ammonia, chloride	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers)	ton	50	0	0	to	52	0	0
Ammonia, nitrate	ton	55	0	0	to	60	0	0
Ammonia, phosphate	ton	80	0	0	to	85	0	0
Ammonia, sulphocyanide	lb.	0	3	0	to	0	3	0
Amyl acetate	ton	150	0	0	to	160	0	0
Arsenic, white, powdered	ton	32	0	0	to	35	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	15	0	0	to	16	0	0
Nitrate	ton	42	10	0	to	45	0	0
Barium Sulphate, blanc fixe, dry	ton	26	0	0	to	28	0	0
Sulphate, blanc fixe, pulp	ton	16	0	0	to	16	10	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	0
Bleaching powder, 35-37%	ton	14	0	0	to		—	
Borax crystals	ton	31	0	0	to	32	0	0
Calcium acetate, Brown	ton	8	0	0	to	9	0	0
,, Grey	ton	10	0	0	to	11	0	0
Calcium Carbide	ton	27	0	0	to	28	0	0
Chloride	ton	12	10	0	to	13	0	0
Carbon bisulphide	ton	60	0	0	to	62	0	0
Casein, technical	ton	85	0	0	to	90	0	0
Cerium oxalate	lb.	0	3	6	to	0	3	9
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	11	0	to	0	11	6
Oxide, black	lb.	0	16	0	to		—	
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	28	0	0	to	29	0	0
Cream Tartar, 98-100%	ton	125	0	0	to	130	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	90	0	0	to	92	10	0
Formusol (Rongalite)	lb.	0	3	9	to	0	4	0
Glauber salts, commercial	ton	5	5	0	to	5	10	0
Glycerine, crude	ton	70	0	0	to	72	10	0
Lithopone, 30%	ton	27	0	0	to	29	0	0
Magnesium chloride	ton	12	0	0	to	13	0	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	10	10	0	to	11	10	0
Sulphate (Druggists')	ton	15	10	0	to	17	10	0
Manganese, Borate	ton	70	0	0	to	75	0	0
Sulphate	ton	70	0	0	to	75	0	0
Methyl acetone	ton	85	0	0	to	90	0	0
Alcohol, 1% acetone	ton	105	0	0	to	110	0	0
Nickel sulphate, single salt	ton	65	0	0	to	66	0	0
Nickel ammonium sulphate, double salt	ton	67	0	0	to	68	0	0
Potash, Caustic	ton	29	0	0	to	29	10	0
Potassium bichromate	lb.	0	0	9	to		—	
Carbonate, 90%	ton	29	0	0	to	30	0	0
Chloride	ton	36	0	0	to	38	0	0
Chlorate	lb.	0	0	5	to	0	0	5½
Meta bisulphite, 50-52%	ton	120	0	0	to	125	0	0
Nitrate, refined	ton	45	0	0	to	47	0	0
Permanganate	lb.	0	1	2	to	0	1	4
Prussiate, red	lb.	0	2	0	to	0	2	1
Prussiate, yellow.	lb.	0	1	2½	to	0	1	3
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt	3	5	0	to		—	
Seconds	cwt	3	0	0	to		—	
Sodium acetate	ton	28	0	0	to	30	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	6½	to	0	0	7
Bisulphite, 60-62%	ton	27	10	0	to	30	0	0
Chlorate	lb.	0	0	5½	to	0	0	5½
Caustic, 70%	ton	24	0	0	to	24	10	0
Caustic, 76%	ton	25	0	0	to	25	10	0
Hydrosulphite, powder, 85%	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial	ton	15	0	0	to	16	0	0
Nitrite, 96-98%	ton	40	0	0	to	42	0	0
Phosphate, crystal	ton	23	0	0	to	25	0	0
Perborate	lb.	0	1	6	to	0	1	7
Prussiate	lb.	0	0	8	to	0	0	8½
Sulphide, crystals	ton	17	0	0	to	18	0	0
Sulphide, solid, 60-62%	ton	23	0	0	to	24	0	0
Sulphite, cryst.	ton	15	0	0	to	16	0	0
Strontium carbonate	ton	80	0	0	to	85	0	0
Strontium Nitrate	ton	75	0	0	to	77	10	0
Strontium Sulphate, white	ton	7	10	0	to	8	10	0
Sulphur chloride	ton	41	0	0	to	42	0	0
Sulphur, Flowers	ton	13	0	0	to	14	0	0
Roll	ton	13	0	0	to	14	0	0
Tartar emetic	lb.	0	1	5	to	0	1	6
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Tin Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb	0	1	5	to	0	1	6
Zinc chloride, 102 Tw.	ton	21	0	0	to	22	10	0
Chloride, solid, 96-98%	ton	50	0	0	to	55	0	0
Oxide, 99%	ton	40	0	0	to	42	0	0
Dust, 90%	ton	47	10	0	to	50	0	0
Sulphate	ton	21	10	0	to	22	10	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	3	6	to	0	3	9
Alphanaphthol, refined	lb.	0	4	0	to	0	4	3
Alphanaphthylamine	lb.	0	2	6	to	0	2	8
Aniline oil, drums extra	lb.	0	1	5	to	0	1	6
Aniline salts	lb.	0	1	6	to	0	1	7
Anthracene, 40-50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	4	3	to	0	4	6
Benzidine, base	lb.	0	6	0	to	0	6	6
Benzidine, sulphate	lb.	0	6	6	to	0	7	0
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzoate of soda	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	7	3	to	0	7	6
Betanaphthol	lb.	0	2	3	to	0	2	6
Betanaphthylamine, technical	lb.	0	9	6	to	0	10	0
Croceine Acid, 100% basis	lb	0	4	6	to	0	5	0
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	6	9	to	0	7	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	6	to	0	1	8
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	2	9	to	0	3	0
Dimethylaniline	lb.	0	3	9	to	0	4	0
Diphenylamine	lb.	0	4	6	to	0	4	9
H-Acid	lb.	0	9	0	to	0	10	0
Metaphenylenediamine	lb.	0	5	6	to	0	5	9
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	0	to	0	7	3
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9

	per	£	s.	d.		£	s.	d.
Iron perchloride	ton	45	0	0	to	50	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	47	10	0	to	49	0	0
Carbonate (White Lead)	ton	43	0	0	to	46	0	0
Nitrate	ton	48	0	0	to	50	0	0
Litharge	ton	35	10	0	to	36	0	0
Monosulphonic Acid (2:7)	lb.	0	7	0	to	0	7	6
Naphthionic acid, crude	lb.	0	4	0	to	0	4	3
Naphthionate of Soda	lb.	0	4	3	to	0	4	6
Naphthylamin-di-sulphonic-acid	lb.	0	4	9	to	0	5	0
Nitronaphthalene	lb.	0	1	4	to	0	1	5
Nitrotoluol	lb.	0	1	3	to	0	1	4
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	2
Orthotoluidine	lb.	0	2	3	to	0	2	6
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	12	0	to	0	12	6
Para-amidophenol, hydrochlor	lb	0	12	6	to	0	13	0
Paradichlorbenzol	lb.	0	0	7	to	0	0	8
Paranitraniline	lb.	0	4	6	to	0	4	9
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	13	0
Paratoluidine	lb.	0	7	0	to	0	7	6
Phthalic anhydride	lb.	0	3	9	to	0	4	0
Resorcin, technical	lb.	0	4	0	to	0	4	6
Resorcin, pure	lb.	0	7	6	to	0	8	0
Salol	lb.	0	2	6	to	0	2	9
Sulphanilic acid, crude	lb.	0	1	4	to	0	1	6
Tolidine, base	lb.	0	6	6	to	0	7	·
Tolidine, mixture	lb.	0	2	6	to	0	2	9

Metals and Ferro Alloys

The following prices are furnished by Messrs. Miles, Mole & Co., Ltd., 101, Leadenhall Street, London, E.C.

	Per	£	s.	d.		£	s.	d.
Aluminium, 98-99%	ton	120	0	0	to	122	0	0
Antimony, English	ton	37	0	0	to	40	0	0
Copper, Best Selected	ton	68	0	0	to	69	0	0
Ferro-Chrome, 4-6%	ton	34	0	0	to	35	0	0
Ferro-Chrome Manganese, loose	ton	18	0	0	to	20	0	0
Silicon, 45-50%	ton	14	0	0	to	16	0	0
Tungsten, 75-80%	lb.	0	1	6	to	0	1	9
Lead Ingots	ton	25	0	0	to	26	0	0
Lead Sheets	ton	36	0	0	to	37	0	0
Nickel, 98-99%	ton	190	0	0	to	190	0	0
Tin, English	ton	154	0	0	to	155	0	0
Spelter	ton	25	0	0	to	26	0	0

Structural Steel

	Per	£	s.	d.		£	s.	d.
Angles and Tees	ton	13	0	0	to	14	0	0
Flats and Rounds	ton	13	0	0	to	14	0	0
Joists	ton	14	0	0	to	15	0	0
Plates	ton	14	0	0	to	15	0	0
Rails, heavy	ton	14	0	0	to	14	10	0
Sheets, 24 Gauge	ton	17	10	0	to	18	0	0
Galvanized Corrd. Sheets	ton	21	0	0	to	22	0	0
Zinc Sheets	ton	34	0	0	to	35	0	0

The Rubber Position

Messrs. Francis Welby & Co., 9, Mincing Lane, E.C.3, in their weekly rubber report, state: The plantation rubber market, after a firm opening in the early part of the week, failed to maintain the higher level of prices, which are slightly lower on balance. No doubt the increase of 488 tons in the London stocks had a depressing effect on the market, and this factor, together with the reluctance of sellers to accept lower prices, had caused business to be restricted to a minimum. The American market is also dull and featureless, while demand from the home trade is of very moderate proportion. Stocks of plantation have increased 488 tons; stock in London, 73,231 tons; imported, 1,489 tons; delivered, 1,001 tons. Until the effect of the September tenders is manifest, the tendency of the market is uncertain.

THE PRODUCTION OF SALT in the Fukien province of China during 1920 amounted to 40,103 tons. The output of the various salt works, according to an American Consular Report, was as follows: Putien (including Chiangyin and Hantsoliao), 7,557 tons; Chienhsia, 20,548 tons; Shangyao, 9,332 tons; Chengpien, 1,607 tons; and Lienho, 1,059 tons.

British Association Finances

Next Year's President Proposed

AT the inaugural general meeting of the British Association on Wednesday evening in the Usher Hall, Edinburgh, the Council reported to the General Committee of the Association that they would propose Professor C. S. Sherrington, of Oxford University, now President of the Royal Society, as President for the meeting at Hull in 1922.

The financial statement presented by the treasurer showed that there was a deficit in last year's accounts, and it would be impossible to make any grants for research out of ordinary income this year, but grants of £100 for seismological investigations, £200 to the Plymouth marine biological laboratory, and various other grants to fulfil the conditions for support from the Department of Scientific and Industrial Research, in all £570, already pledged, would be met from the Caird Fund. Possibly £300 from the same fund would be available for new grants. Expenses continued to increase, notwithstanding the economies effected on printing and salaries. This dismal outlook is somewhat brightened by the unusually large receipts from the present meeting. In future it is expected that research committees appointed by the Association will have to depend for funds chiefly on the Department of the Scientific and Industrial Research. This prospect is greatly deplored, as it will destroy much scientific freedom and initiative.

On Friday a deputation from Liverpool was expected to invite the Association to that city in 1923. For 1924 there is a possibility of an invitation from Canada with headquarters at Toronto, but the suggestion is yet only in the preliminary stages.

The general committee is sending a telegram to Sir Archibald Geikie, the president of the Association at its last Edinburgh meeting, and now in his 87th year, gratefully recalling his past services and congratulating him on continued health.

United States Dye Embargo

IT is reported from Washington that after having voted in favour of the continuation of the dye embargo until January 1, 1922, the Senate Finance Committee has reversed its decision and appears to be in favour of pressing the resolution in the Senate for passage before the recess in the same form in which it was passed by the House of Representatives. The effect of the resolution as passed by the House is to extend until November 27 the restrictions placed by the Emergency Tariff Bill upon the importation of dyes. Senator Penrose stated that any attempt to extend the Emergency Tariff Bill beyond November 27 would re-open the whole tariff question to debate in the Senate.

Relativity on the Film

IF successful, an Einstein film which is in process of preparation will be a triumph for the German film industry. The much-discussed and little-comprehended theories of the famous professor are to be rendered intelligible to an average audience. The difficulties are said to be almost insurmountable, but several famous scholars, both foreign and native, and two great Berlin engineers are busy with the work. The first part of the film will be produced in December, and is said to depict clearly the foundations upon which Professor Einstein's theory is built. The second part is the development of the theory, and the whole gives a comprehensible presentation of the new doctrine, far better, it is said, than any book which has appeared on the subject.

Wholesale Druggist's Affairs

The first meeting of the creditors of Arthur Fulford, trading as A. Fulford & Co., 71, Bowdon Street, Sheffield, wholesale druggist, was held on September 2 at the Official Receiver's Offices, Figtree Lane, Sheffield. The creditors decided to appoint Mr. Charles Turner as trustee of the estate.

On account of the industrial crisis, the board of the great BELGIAN GLASS-BLOWING FACTORIES at Val St. Lambert has just decided to close down the works. All the blast furnaces will be extinguished on September 15.

TRADE GUIDE

CHEMICAL AGE

Acid Resisting Metals

MONEL Succeeds where other Metals fail. Acid-resisting-Incorrodible Bars, Rods, Sheets, Wire Castings, Forgings.

G. & J. WEIR LTD MONEL DEPT. CATHCART, GLASGOW.

Analytical Reagents

THE BRITISH DRUG HOUSES LIMITED BDH LONDON

Research Chemicals

THE BRITISH DRUG HOUSES, LTD., Graham St., City Rd., LONDON, N.

Asbestos

Pioneers of the World's Asbestos Industry

BELL'S UNITED ASBESTOS Co., Ltd.

Southwark Street, LONDON, S.E.1

(Established 1871)

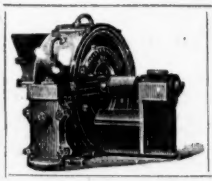
Balances

Oertling LONDON

Chemical Plant

BENNETT SONS & SHEARS, Ltd.

43, SHOE LANE, LONDON, E.C.4.



CHRISTY & NORRIS, CHELMSFORD LTD. (England),

Specialise in GRINDING MACHINERY FOR ALL MATERIALS

Send for Catalogue, *State Requirements.*

THE Trade Guide is a compact and handy form of reference to a representative list of firms engaged in various branches of the Industry. In most cases fuller particulars may be found by referring to the displayed advertisement elsewhere.

Chemical Plant (*Continued*)

Centrifuges
Autoclaves
Sterilizers, etc.

CHARLES HEARSON & Co., Ltd.
WILLOW WALK, BERMONDSEY, S.E.

Carbons

NORIT.

THE decolorising carbon and Refining Agent.
30 Times adsorptive capacity of bone char.
In five grades.

JOSEPH BAKER SONS & PERKINS LTD.,
Head Offices: KINGSWAY HOUSE, KINGSWAY, W.C.2
Telegrams: "Bakers, London."

Colours and Oxides

OXIDES CHROME COBALT
CADMIUM SULPHIDE, SELENIUM, ETC., ETC.

BLYTHE COLOURS for POTTERY, GLASS, ENAMELLED IRON, AND CEMENT.

Est. 1870. CRESSWELL, STOKE-ON-TRENT, ENGLAND.

Disinfectants

ALL GRADES, PERCENTAGES AND CO-EFFICIENTS
ALSO
LIQUID SOAPS

W. GARDINER & CO.
83, Broad Street, Camlachie, Glasgow

Drums and Tins

JOHN FEAVER,
TOWER BRIDGE ROAD, S.E. 1.

TINS for
PRESERVED PROVISIONS and FOODSTUFFS.
CANS for VARNISH, PAINT.
DRUMS & TAPERS for OILS, VARNISH.
Samples and Prices on application.

Essential Oils

VIOFLOR REG.

Covers Objectionable Smells in Manufacture of White Spirit Turpentine Substitutes, etc.

CREPIN & DOUMIN, Ltd.
15, COOPERS ROW, E.C.3

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KESTNER PATENT
EVAPORATORS
ACID ELEVATORS
FANS
EXTRACTORS
CRYSTALLIZERS

Kestner Evaporator & Engineering Co. Ltd
5 Grosvenor Gardens, Westminster, S.W.1.

MULTIPLEX AND SIMPLEX FILM EVAPORATORS.
DISTILLING PLANT.
DRYING PLANT OIL HARDENING PLANT.

BLAIR CAMPBELL & McLEAN Ltd GLASGOW

MAKERS OF ALL TYPES OF CHEMICAL PLANT.

Filterpresses

P.F.C. THE RESULT OF 60 YEARS EXPERIENCE

PREMIER FILTERPRESS Co. LTD.

FINSBURY PAVEMENT HOUSE, LONDON, E.C.2

S. H. JOHNSON & CO., LTD.
CARPENTERS ROAD,
STRATFORD,
E. 15.
FILTER PRESSES

Company News

PREMIER SOAP CO. OF INDIA.—The directors recommend the payment of a dividend of one rupee per share for the period ended March 31.

RECKITT & SONS.—The directors announce an interim dividend at the rate of 5 per cent. per annum, less tax, on the ordinary shares for the half-year, payable on October 1.

LEVER BROTHERS, LTD.—A Stock Exchange announcement states that dealings in 70 seven per cent. peference shares of £1 each, fully paid, Nos. 23,560,436 to 23,560,505, and 35 eight per cent. "A" preference shares of £1 each, fully paid, Nos. 15,468,303 to 15,468,337, have been specially allowed by the Committee under Rule 148*a*. These securities will rank *pari passu* with those in which special settling days have already been appointed, as soon as they are identical and the certificates are ready for distribution, and with those for which an official quotation has already been granted as soon as they are identical and are officially quoted.

AMERICAN CYANAMID.—The report for the year to June 30, 1921, shows a gross profit of $743,171 after charging $1,175,330 for depreciation of plant and equipment and shrinkage of inventory values, and net income of $344,110, after providing reserves of $333,975 for income-tax and depreciation of patents. Surplus account shows an increase of $398,860 for the year, and now stands at $3,291,489, in addition to various reserves totalling $3,445,277. Outstanding preferred stock has been reduced by $2,398,300, leaving balance outstanding of $5,595,900. The report states that the operations of the Owl Fumigating Corporation, in which this company owns a half interest, acquired during the preceding year, have been fully as profitable as anticipated, and the indications are that the ensuing season will be equally profitable. There have been no activities of the company's subsidiary, the Air Nitrates Corporation, during the year.

STANDARD CHEMICAL CO.—The report for the fifteen months ending March 31 shows a net profit of $340,327, but owing to writing off depreciation and the purchase of refining equipment, a loss for the period of $166,917 is indicated. Mr. David Gilmour, the president, states that the last nine months have been a time of anxiety, owing to the disturbances which appeared in all fields of chemical activity. The outlook was extremely difficult to gauge. All that could be said was that the company's present financial condition, combined with the advances in technical processes, already established, pointed to its ability to benefit quickly from any forward movement in trade conditions. The charges set off against the profits for the period were $507,295, including alterations and repairs to crude factories $140,630, and $97,430 for alterations to the refinery at Montreal. Depreciation in raw materials and partly finished products was taken at $275,000, and depreciation on buildings was taken at $200,000. Interest on debentures and bank loans was reduced from $89,927 in 1919, to $69,234 last year. Total liabilities have been reduced by $264,904, and the ratio of current assets to current liabilities has improved since last report, from 2.75 to 1, to 3.20 to 1. During this period 107,490 cords of wood were carbonised; sales amounted to $4,984,000. The charcoal markets had remained firm, the company disposing of its whole production in Canada. About 30 per cent. of the crude plant capacity of the company was being operated; but any recovery in European conditions would benefit them in particular, as the company had an established European market, before the war, and would have in future as demand increased.

The Italian Customs Tariff

H.M. Consul-General at Milan (Mr. W. A. Churchill) points out that the new Italian Customs Tariff which came into force on July 1 does not appear to be generally known or understood by United Kingdom firms. The effect of the high exchange and the high customs tariff has been to bring imports into Italy from this country, in common with others, to a standstill. Exporters to Italy should therefore make careful inquiries as to duties and other points before shipping. The complete new Customs Tariff, which was referred to in THE CHEMICAL AGE (Vol. V., p. 141) appeared in the Board of Trade "Journal" of July 21. The Department of Overseas Trade, 35, Old Queen Street, Westminster, S.W.1., is prepared to render assistance to inquirers in respect of these matters.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. NO.
Canada (Prince Edward Island) ...	Super-phosphate fertilisers. Replies to the High Commissioner for Canada, 19, Victoria Street, London, S.W.1.	—
Cape Town ...	Druggists' sundries	186
Rome... ...	Glassware	189
Porto Alegre...	Arsenic; caustic soda; resin; chemicals	192
Canada ...	Industrial chemicals	—
Toronto ...	Glassware	—
Cape Town ...	Paints; oils (including refined linseed oil); colours	—
Port of Spain	Oils; greases	—

Tariff Changes

CANADA.—Regulations regarding the method to be employed in marking or stamping goods imported into Canada were published in the Board of Trade *Journal* (September 1, pp. 235-6). It should be noted, however, that the operation of these provisions has been postponed until December 31.

ESTHONIA.—The Customs duties on certain imported gums, resins and resinous substances, volatile and aromatic oils, &c., have been modified. Particulars as to the rates of duty in respect of any particular goods may be obtained from the Tariff Section, Department of Overseas Trade, 18, Queen Anne's Gate, S.W.1.

FRANCE.—As from August 21, the following goods are subject to the "coefficients of increase" shown in parentheses after each article:—hoop wood (2); infusorial earth or kieselguhr (1·8); liquefied chlorine (3); hydrochloric acid (ordinary) (3·6); liquefied sulphurous acid (5); sulphate of alumina (5); alum of ammonia and of potash (3·5); peroxide of barium (5); chromate and bichromate of potash and of soda (4); magnesium chloride (6); sulphate of magnesia (5); sulphate of soda, anhydrous, containing, naturally, less than 25 per cent. of salt (5·5); and rectified methyl alcohol (3·7). Goods proved to have been dispatched direct to France prior to August 21 will be admitted at the former rates of duty.

LATVIA.—In the new Customs Tariff which came into operation on July 20, the duties are on a specific basis and are, generally, fixed at rates very much higher than those previously in force. The duties are assessed in gold francs on gross weight and are payable in Latvian roubles in accordance with the rate of exchange of the gold franc announced periodically by the Latvian Government. The present rate of exchange is 100 Latvian roubles per gold franc. Particulars of the rates of duty on any class of goods are obtainable from the Tariff Section of the Department of Overseas Trade. The Tariff also provides for the withdrawal of existing prohibitions of the importation of goods into Latvia.

LUXEMBURG.—The new Customs tariff which became operative on August 1 appears to be identical with the Belgian Customs tariff, both as regards classification and rates of duty. Imformation as to the rates of duty may be obtained from the Tariff Section of the Department of Overseas Trade

TUNIS.—Natural phosphates of lime may be exported to all destinations without special authorisation.

UNITED STATES OF AMERICA.—H.M. Ambassador at Washington reports, by cable, that an amendment was passed by the United States Congress, and was signed by the President on August 25, continuing the dye import control until November 27 next. The control of the importation of dyes and chemicals into the United States was continued in force for a period of three months by Title V. of the Emergency Tariff Act of May 27. The control would have ended on August 27 but for the passage of this amendment.

TRADE GUIDE

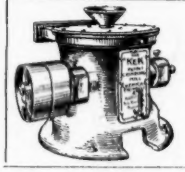
CHEMICAL AGE

Furnaces

General Chemicals

Glassware

Grinding Mills



Heavy Chemicals

THE Trade Guide will undoubtedly be found of great assistance by buyers; should any information be required which cannot be found herein a request to the "Chemical Age" Business Manager will bring a ready response.

Instruments

Oil and Fuel

Oil and Fuel—(*Continued*)

Phosphates

Steam Fittings

Sulphur

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Company Winding-up Voluntarily

GENERAL PHOSPHATE COMPANY, LTD. Herbert Thomson McConville, 65, London Wall, London, E.C., appointed liquidator.

Liquidator's Notice

BRITANNIA NITRATE COMPANY, LTD. (in voluntary liquidation).—General meeting of company at 145, Dashwood House, New Broad Street, London, E.C.2, on Thursday, October 6, at 12 noon, to receive report of winding-up. James Rennie, liquidator.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.]*

RANDALL & WILSON, LTD. (late Randall & Son, Ltd.), Southampton.—Registered August 22, £4,500 debentures; charged on 146, High Street, the Laboratory, Lansdowne Lane and Zion Hall, Southampton, also general charge. *£6,500. September 9, 1920.

GREENGATE COLOUR WORKS, LTD., Salford.—Registered August 24, £1,000 debentures, to R. Dobson and another, Manchester; general charge. *Nil. September 1, 1920.

MAY ROBERTS & CO., LTD., London, E.C.—Registered August 24, charge under Land Transfer Acts securing £2,500 (auxiliary to mortgage registered October 6, 1920), to B. B. Thorne-Thorne, Grasmere, Mount Hermon, Woking, and another; charged on 11, Springfield, Upper Clapton. *£8,500. June 23, 1921.

Satisfactions

RANDALL & WILSON, LTD. (late Randall & Son, Ltd.), Southampton.—Satisfaction registered August 22, £1,000 registered January 15, 1917.

DOUGHTY SON & RICHARDSON, LTD., Lincoln.—Satisfaction registered August 27, £40,000, amount outstanding July 1, 1908.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

BAKER, ALBERT JOHN JOSEPH, The Broadway, Leigh-on-Sea, chemist. £11 5s. 10d. July 12.

GERRING, C., New Romney, chemist. £13 6s. 10d. July 14.

DOWSONS, LTD., 3, Market Place, Colne, chemists. £17 7s. 7d. July 15.

SMITH, A., 157, Great Ancoats Street, Manchester, chemist. £11 10s. July 12.

CLIFTON, D., 13, Bread Street Hill, chemist. £11 11s. July 12.

EDWARDS, J. M., 311, Fulham Palace Road, chemist. £17 18s. 4d. July 12.

SKEAT, CHARLES, 609, High Road, Tottenham, chemist. £14 15s. 8d. July 12.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.2:—

BURNS (WESTHOUGHTON), LTD., Railway Works, Slack Lane, Westhoughton, Lancashire, wholesale and retail and manufacturing chemists. Nominal capital: £3,000 in 3,000 shares of £1 each. Directors: Catherine Holt, J. Lythgoe, E. Cutsforth. Qualification of directors: £100. Remuneration of directors: 50 per cent. of the net half-yearly profits.

COURTIN & WARNER, LTD., 8, Harp Lane, E.C., manufacturing chemists. Nominal capital: £20,000 in 20,000 ordinary shares of £1 each. Directors: H. G. Warner, L. E. Courtin. Qualification of directors: 50 shares.

MACNAIR (A.) & COMPANY, LTD. To carry on the business of oil and colour merchants. Nominal capital: £20,000 in 10,000 ordinary shares and 10,000 7½ per cent. cumulative preference shares of £1 each. Directors: A. Macnair, A. S. Macnair. Qualification of directors: One share.

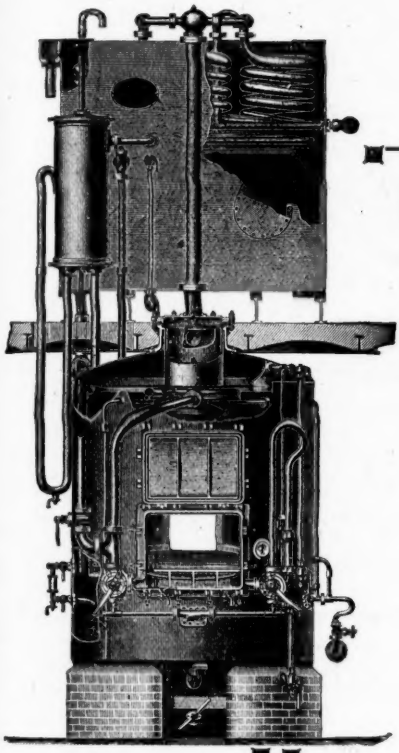
RAINBOW DYES, LTD., dyers. Nominal capital: £2,000 in 1,900 shares of £1 each and 2,000 shares of 1s. each Directors: To be appointed by subscribers. Subscribers: J. E. Stevens, R. Martin.

Colombian Oilfields

A MEETING of the Colombian Oilfields, Ltd., was held at Pinners Hall on Tuesday, Mr. Frances Allen presiding in the absence of Sir Newton H. Moore, M.P. The Chairman explained that, as the accounts had not yet come from the other side, he regretted the necessity for postponing the meeting. They hoped soon to be able to submit the accounts to the shareholders. A resolution postponing the meeting was carried. Asked if he could give the meeting any information as to the position of affairs, the Chairman said he thought he might tell them without incurring any risk that the negotiations with the Shell Co. were proceeding in a very friendly and satisfactory manner, and the board hoped that a decision would be arrived at in about six weeks or possibly less.

Electrolytic Production of Chlorine

MR. C. W. MARSH, in an article in *Canadian Chemistry and Metallurgy*, describes the Marsh electrolytic cell for the production of chlorine and caustic soda. The cell contains a series of horizontal cylindrical graphite anodes arranged in vertical or inclined position one above the other, perforated, corrugated sheet steel cathodes arranged so as to conform closely to the surface of the anodes, and asbestos paper diaphragms clamped tightly to the edges of the cathodes. Arrangements are made for collecting both hydrogen and chlorine. Single cells are made to take up to 2,500 amperes. The ampere efficiencies over long periods amount to 90 per cent.; the power efficiencies to 50 to 65 per cent. Owing to the frequent intervals between the anode elements fresh brine is always present between the electrodes, so that the brine is always saturated. The polarisation due to the gases is minimised because the shape of the arrangement of the electrodes throw the gases back and away from the active zone. The internal resistance due to the accumulation of gas bubbles is almost entirely removed, so that the voltage is the lowest that could be obtained in a cell of minimum height. Owing to the manner in which the anode elements are placed in the corrugations of the cathode, the entire surface of the anodes becomes active. As a result the voltage is low and very uniform so that the wear on the graphite is uniform over the whole surface and is confined to the active surface, the leading-in posts showing very little wear. The wear of the anodes is much reduced, so that the amount of graphite deposited on the diaphragms becomes much less and normal operating periods are much longer (50 per cent. more, and over). The resulting conservation of materials makes it practicable to design a cell requiring less building area, and which on account of its light weight may be handled by cheap overhead cranes or on rollers.



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OIL EXTRACTION!

WE CAN OFFER FOR IMMEDIATE DELIVERY

OIL EXTRACTION PLANTS

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FOR EXTRACTING OILS, FATS, WAXES, Etc.
From SEEDS, COPRA, FULLER'S EARTH, BONES,
PRESSCAKE, or ANY OIL-BEARING MATERIAL

REDUCED PRICES

HIGHEST EFFICIENCY
IN WORKING COSTS AND YIELD

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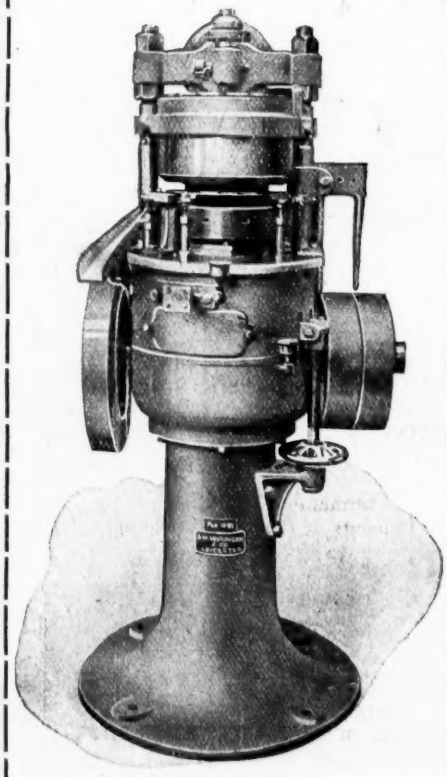
21, PANTON ST., LONDON, S.W.1

TELEPHONE: GERRARD 1327 TELEGRAMS: CHEMFICHA, CHARLES, LONDON



ROTARY TABLET MACHINES.

PATENT

These Machines are now made in 4 sizes:—

12-Punch Ordinary for Tablets from $\frac{3}{8}$" to $\frac{7}{8}$" diameter,
Output 400 per min.

20-Punch Ordinary for Tablets from $\frac{1}{4}$" to $\frac{1}{2}$" diameter,
Output 700 per min.

12-Punch Heavy for thick Tablets and Blocks 1" diameter,
Output 250 per min.

18-Punch Heavy for thick Tablets and Blocks 1" diameter,
Output 400 per min.

LISTS ON APPLICATION.

DURING the war these machines ran 16 hours a day non-stop.

SINGLE punch machines made in 5 sizes for tablets from $\frac{1}{8}$" to $1\frac{1}{2}$" diameter, also lozenges.

S. W. WILKINSON & CO.,

PHARMACEUTICAL ENGINEERS,
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German Oils and Fats

FOLLOWING the removal of Government control of oils and fats the sale of these products during 1920 was, according to information furnished by the German Ministry of Economics, greatly enlivened. The oil mills, however, were not able to reap the benefits of this revival owing to a lack of raw materials, as a result of which they were only able to work at from 30 to 32 per cent. of their normal capacity. This was not so, however, with the refineries, which were able to work well up to capacity, especially during the last four months of the year, when their facilities for production could be fully utilised. The soap industry suffered severely during the first half year from lack of soda and calcium oxide. The shortage of coal was also keenly felt. As a result of these shortages it was impossible for the manufacturers to supply the domestic demand. Towards the middle of the year more adequate supplies of raw materials became available, and the production of standardised products was increased. The increased price of soap made necessary by the costly raw materials had the effect of slackening the normal demand, but the market showed signs of improvement towards the middle of August, when the prices for delivery f.o.b. plant were reduced. On November 1 the manufacture of standardised products was discontinued, and the members of the Seifen-Herstellungs-und Betriebsgesellschaft (Association of Soap Manufacturers), including those plants which had been closed during the Government's control of this industry, were accorded the opportunity of manufacturing various classes of soap products within certain established limits.

It has been stated that the United States War Department intends to distribute more than 12,000,000 lb. of PICRIC ACID to farmers for agricultural purposes. This surplus stock, accumulated for war purposes, will be distributed through the Bureau of Public Roads of the Department of Agriculture, the only cost to farmers being freight charges and six cents a pound for placing the powder in the necessary cartridges.